UNITED STATES DISTRICT COURT

NORTHERN DISTRICT OF OHIO

EASTERN DIVISION (YOUNGSTOWN)

OHIO PUBLIC EMPLOYEES RETIREMENT SYSTEM, On Behalf of Itself and all Others Similarly Situated,
 	
                Plaintiff,
 	
 v.
 	
 FEDERAL HOME LOAN MORTGAGE, CORPORATION a/k/a FREDDIE MAC RICHARD F. SYRON, PATRICIA L. COOK, ANTHONY S. PISZEL, and EUGENE M. McQUADE,
 	
                Defendants.
	CIVIL ACTION NO. 4:08-cv-160

EXPERT REPORT OF MUKESH BAJAJ

December 14, 2012

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I.   QUALIFICATIONS

1.   I am the Managing Director and the global head of the Securities and Finance Practice at Navigant Economics, a consulting firm that applies economic and financial analysis to legal, regulatory and business matters. Prior to that, I was the President and founder of AFE Consulting, an economic and financial consulting firm. Before founding AFE Consulting in January 2011, I served as a Senior Managing Director and the global leader of the Securities and Finance practice at LECG, LLC, where I was employed since 1997.

2.   In 1988, I graduated from the University of California at Berkeley earning a Ph.D. in Business Administration with a specialty in finance. I also was awarded an M.B.A. from the University of Texas at Austin in 1987. Prior to my graduate level studies, I was awarded a Bachelor of Technology degree in 1981 from the Indian Institute for Technology (Delhi, India).

3.   As a financial economist, I specialize in the study of capital markets, including the valuation of stocks, bonds, warrants, restricted stock and other complex contingent securities, intellectual property, intangible assets, corporate hedging practices (through derivatives and other methods), event studies to determine the significance of stock price reactions to particular events, market efficiency, materiality and loss causation issues related to securities class action claims.

4.   Since 1996, I have been engaged as an expert on numerous matters involving valuation of firms, their securities, and their intangible assets and intellectual property. I have testified as an expert either in court or at deposition in 57 matters, including 24 matters concerning liability and/or damages issues in securities fraud cases. In such securities fraud cases, I have testified on behalf of the federal government in a criminal matter, as well as on behalf of both plaintiffs and defendants in civil matters.

5.   I have been asked on numerous occasions to examine the materiality of alleged misrepresentations and omissions in securities litigation. I have analyzed such materiality using my knowledge of financial economics literature, analysis of publicly available information and conducting event studies. I have testified on the assessment of materiality in numerous matters.

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6.   I have also been asked on multiple occasions to examine the efficiency of the markets of various securities including equities, preferred securities and corporate bonds. The empirical methods I have considered in this context are consistent with the standards that financial economists use as well as the standards that courts use to determine the efficiency of the market of the specific security in question.

7.   In addition to my work with Navigant Economics, I am also a practicing academic with an active research program. I am a visiting lecturer with the Haas School of Business ("Haas") at the University of California at Berkeley, where I teach graduate-level courses in corporate finance, investments, and financial engineering. At Haas, I served as a Graduate Student Instructor while earning my Ph.D. between 1983 and 1988. From 1988 to 1995, I was an Assistant Professor of Finance and Business Economics at the University of Southern California, in Los Angeles. I have taught the efficient markets hypothesis (EMH) as part of my graduate-level courses.

8.   I have authored or co-authored more than twenty-five publications and working papers in the field of financial economics. My research has frequently employed various statistical techniques, including event studies, to analyze the impact of news announcements and other events on companies' stock prices. My research has been published in *The Journal of Finance*, *The Journal of Financial Economics*, *The Journal of Financial Research*, *The Journal of Applied Finance*, *International Economic Review*, *Research in Finance*, *The Journal of Corporation Law*, and *The Journal of Derivatives*.

9.   I am a member of the American Finance Association, the Western Finance Association, and the European Finance Association, and I have lectured widely on a variety of issues in financial economics. A curriculum vitae detailing my credentials is attached to this report as Appendix 1.

10.   Navigant Economics is being compensated for my work on this matter at my regular hourly rate of $875. That compensation is not in any way dependent on the opinions I express on issues in this case. I am independent of defendants, plaintiffs, and any other parties named in this matter. I have been assisted in my work on this case by my

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colleagues at Navigant Economics, for whose work Navigant Economics is being paid its regular rates.

11.   The documents I have relied upon in connection with this affidavit are listed on Appendix 2 and/or cited herein (including appendices to this report). If additional information becomes available, I reserve the right to supplement and/or modify the opinions set forth in this report.

II.   ASSIGNMENT AND CONCLUSIONS

12.   The Plaintiff, Ohio Public Employees Retirement System ("OPERS"), seeks to represent a class of investors who purchased the common stock of the Federal Home Loan Mortgage Corporation ("Freddie Mac" or the "Company") from August 1, 2006 through and including November 20, 2007 (the "Proposed Class Period" or the "Class Period").[1] The Plaintiff alleges that Defendants made alleged material misrepresentations and omissions[2] "throughout the Class Period… relating to, among other things": [3]

> (i) [Freddie Mac's] exposure to or risk of loss from subprime mortgage loans and other nontraditional, high risk mortgages, including "Alt-A" mortgages (a mortgage industry term to describe reduced documentation/higher credit risk loans);
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> (ii) its underwriting guidelines and Defendants' adherence to those guidelines,
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> (iii) its loan analysis software and fraud detection systems,
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> (iv) its risk management measures and its risk management performance, and
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> (v) its capital position.

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[1]   *OPERS On Behalf of Itself and all Others Similarly Situated, (collectively, "Plaintiff"), vs. Federal Home Loan Mortgage Corporation a/k/a Freddie Mac, Richard F. Syron, Patricia L. Cook, Anthony S. Piszel, And Eugene M. McQuade (collectively "Defendants").* Third Amended Complaint For Violations Of Federal Securities Laws, United States District Court, Northern District Of Ohio, Eastern Division (Youngstown) Civil Action No. 4:08-cv-160 (henceforth, "the Complaint" or "TAC"), ¶13. Henceforth I refer to Freddie Mac's specific financial quarters in numeric terms as Q1, Q2, Q3 or Q4 denoting the first through fourth quarter, respectively.

[2]   To be concise, I will refer to alleged misrepresentations and alleged omissions together as "misrepresentations," except when I treat them separately, in which case I will indicate that I am doing so.

[3]   TAC, ¶2.

13. In the TAC, the Plaintiff alleges that curative disclosures related to the alleged misrepresentations began on November 20, 2007 (the last day of the Proposed Class Period) and continued until at least September 23, 2008.[4]

14. The Plaintiff alleges that, in seeking damages related to the alleged misrepresentations, it is entitled to the presumption of reliance established by the fraud-on-the-market doctrine and asserts that:

   a. "At all times relevant to this Complaint, the market for Freddie Mac common stock was **an efficient market**," (*i.e.*, "promptly digested current information regarding Freddie Mac from all publicly available sources and reflected such information in the market prices for Freddie Mac common stock **at all relevant times**");[5]

   b. The Defendants "failed to disclose **material information** regarding Freddie Mac's subprime exposure, internal controls, risk management, financial condition, results and business operations";[6] and

   c. The Plaintiff and other members of the Class, "as purchasers of Freddie Mac common stock during the Class Period, suffered similar injury through their purchase of Freddie Mac's common stock at **artificially inflated prices** and a presumption of reliance applies."[7]

15. I have been asked by Freddie Mac's counsel to review certain analyses and conclusions concerning market efficiency for Freddie Mac's common stock (or "Freddie Mac stock") proffered by the Plaintiff's expert, Dr. Greg Hallman, in a report dated August 16, 2012 (the "Hallman Report"). I have also been asked by Freddie Mac's counsel to review the

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[4] TAC, Section V.D.

[5] TAC, ¶266-267 (emphasis added). Henceforth, all quoted text in bold indicates emphasis that I added and bracketed text in quotes indicates text that I added, unless indicated otherwise.

[6] TAC, ¶268.

[7] TAC, ¶267.

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economic evidence as it relates to the Plaintiff's allegations that alleged misrepresentations and omissions were material. My principal opinions are as follows:

Opinion 1.   **Dr. Hallman Fails To Establish that the Market for Freddie Mac Common Stock Was Semi-Strong Form Efficient During the Proposed Class Period, and the Results of His Event Study Suggest That It Was Not.**

Opinion 2.   **The Economic Evidence Does Not Support a Finding That the Alleged Misrepresentations and Omissions Inflated the Price of Freddie Mac's Common Stock or that They Were Material.**

16.   I explain the bases for these opinions below. In addition, attached to this report are appendices that include information referenced herein and analyses that further support my opinions.

17.   In particular, these appendices contain the following:

- Appendix 1: Curriculum Vitae of Mukesh Bajaj

- Appendix 2: Documents Relied Upon

- Appendix 3: Hallman ArthroCare Report

- Appendix 4: Hallman TyCom Report

- Appendix 5: Dr. Hallman Ignores Inconsistent Analyst Commentary With Respect to Each of the Four Analyzed Dates That Yielded Statistically Insignificant Results.

- Appendix 6: Dr. Hallman's Tests of Joint Statistical Significance Are Flawed

- Appendix 7: Industry Developments Related to the GSEs That Dr. Hallman Has Failed To Consider in His Event Study

- Appendix 8: Freddie Mac's Abnormal Return Is Statistically Insignificant on August 30, 2007 after Adjusting for Industry Effects and the Heightened Volatility during the Financial Crisis Post-August 9, 2007

- Appendix 9: Alleged Misstatements and Freddie Mac Stock's Dividend Adjusted Return and Its Abnormal Return Following Such Alleged Misstatements.

III.   DR. HALLMAN FAILS TO ESTABLISH THAT THE MARKET FOR FREDDIE MAC COMMON STOCK WAS SEMI-STRONG FORM EFFICIENT DURING THE PROPOSED CLASS PERIOD, AND THE RESULTS OF HIS EVENT STUDY ANALYSIS SUGGEST THAT IT WAS NOT.

18.   Dr. Hallman's opinion that Freddie Mac's stock traded in a semi-strong form efficient market[8] throughout the Proposed Class Period rests on his mechanical review of certain factors that have been used by some courts as indicators of market efficiency and a flawed event study that purports to detect if Freddie Mac's stock reacted to news on six selected dates. In particular, he cites the following eight factors drawn from the court decisions in *Cammer v. Bloom*, 711 F. Supp. 1264 (D.N.J. 1989) and *Krogman v. Sterritt*, 202 F.R.D. 467 (N.D. Tex. 2001) (hereafter, *Cammer* and *Krogman*):[9]

> (1)   the average weekly trading volume expressed as a percentage of total outstanding shares;
>
> (2)   the number of securities analysts following and reporting on the stock;
>
> (3)   the extent to which market makers and arbitrageurs trade in the stock;
>
> (4)   the company's eligibility to file SEC registration Form S-3 (as opposed to Form S-1 or S-2);
>
> (5)   the existence of "empirical facts showing a cause and effect relationship between unexpected corporate events or financial releases and an immediate response in the stock price";[10]
>
> (6)   the company's market capitalization;

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[8]   Henceforth, I refer to the semi-strong form efficient market simply as an efficient market for ease of exposition. While courts in the United States require semi-strong form efficiency under the fraud-on-the-market theory, the market for a security can exhibit three forms of efficiency: weak form efficiency, semi-strong form or strong form efficiency. In a weak form efficient market, security prices reflect the information contained or present in "just historical prices." [Fama, Eugene F. (1970), "Efficient Capital Markets: A Review of Theory and Empirical Work," *Journal of Finance* 25(2), pages 383-417; henceforth, "Fama (1970)" at page 383.] In a semi-strong form efficient market, security prices reflect the information in historical prices as well as "other information that is obviously publicly available (e.g., announcements of annual earnings, stock splits, etc.)." Finally, in a strong form efficient market, security prices reflect "any information relevant for price formation." [Fama (1970), page 383]. Given the definitions of various forms of market efficiency, it is axiomatic that if a market is not weak form efficient, it cannot be semi-strong form efficient.

[9]   Hallman Report, ¶7.

[10]   *Cammer v. Bloom*, 711 F. Supp.; henceforth "*Cammer*," at 1287 quoted in Hallman Report, ¶7.

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(7)   the bid-ask spread for stock sales; and

(8)   float, the stock's trading volume without counting insider-owned stock.

19.   The *Cammer* court considered the fifth factor, *i.e.*, "empirical facts showing a cause and effect relationship between unexpected corporate events or financial releases and an immediate response in its stock price" to be the most important factor in assessing semi-strong form efficiency. As the *Cammer* court explained in referring to this cause and effect relationship: "This, after all, is the essence of an efficient market and the foundation for the fraud on the market theory."[11]

20.   Dr. Hallman agrees that the fifth factor is the most important factor. At deposition, he stated that the following sentence from the court's decision in <u>In re Polymedica Corp. Sec. Litig.</u>, 453 F. Supp. 2d 260 (D. Mass. 2006) was consistent with his understanding: "The fifth factor (cause and effect relationship) is 'in many ways the most important' and was recognized in *Cammer* itself as 'the essence of an efficient market and the foundation for the fraud on the market theory.'"[12] Indeed, Dr. Hallman testified that, absent a cause and effect relationship, there is not an efficient market:[13]

> Q. If there is no cause and effect relationship between new material information about a company and quick reactions in its stock price, that company's stock does not trade in a semi-strong form efficient market; is that correct?
>
> A. That's correct. That's correct.

21.   In a semi-strong efficient market, stock prices at all times reflect all publicly available information and therefore, as the Complaint recognizes, stock prices should react "promptly,"[14] often within minutes,[15] to new material information regarding stock value.

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[11]   *Cammer* at 1287.

[12]   Transcript of Deposition of Dr. Greg Hallman as taken December 7, 2012 ("Hallman Dep."). 366: 25 - 367: 18.

[13]   Hallman Dep., 79: 9 - 15.

[14]   TAC, ¶267.

[15]   Busse, Jeffrey A. and T. Clifton Green (2002), "Market efficiency in real time," *Journal of Financial Economics* 65, pages 415–437 finds that "stocks discussed positively experience a statistically and economically significant price impact beginning seconds after the stock is first mentioned and lasting

That is, in an efficient market, the stock price should increase promptly following unexpected positive news and promptly decrease following unexpected negative news, and such price changes should fully and correctly reflect the value of the unexpected news. If not, stock prices would not fully reflect <u>all</u> value-relevant information that was then publicly available and the market for these stocks would not be considered semi-strong form efficient. Thus, in an efficient market, a stock's price cannot react to stale information, as the value of such information would already have been promptly impounded into the stock price when it was first released. A delayed price reaction to public information means that the stock did not trade in an efficient market.[16] As Fama (1970) notes:[17]

> In general, semi-strong form tests of efficient markets models are concerned with whether **current** prices 'fully reflect' all obviously publicly available information.

22.   As I discuss in Section III.C below, Dr. Hallman has failed to demonstrate the "cause and effect relationship" between unexpected corporate announcements by Freddie Mac and contemporaneous changes in its stock price that the *Cammer* court deemed "the essence of an efficient market and the foundation for the fraud on the market theory."[18] Indeed, his event study results show that Freddie Mac common stock traded in an inefficient market, if they prove anything at all.

23.   As Dr. Hallman notes, the other seven *Cammer* and *Krogman* factors set forth above refer to "structural" market conditions.[19]   These conditions may promote, but do not necessarily result in, a cause and effect relationship between new information and stock price movements. Accordingly, these conditions are not alone sufficient evidence of

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approximately one minute. The response to negative reports is more gradual, lasting 15 minutes, perhaps due to the higher costs of short selling."

[16]   Tabak, David (2010), "Use and Misuse of Event Studies to Examine Market Efficiency," *NERA Working Paper*; henceforth "Tabak (2010)", page 9. (Noting "A response on the day after news sounds like a potential effect of an inefficient market that incorporates news slowly.")

[17]   Fama (1970), page 404.

[18]   *Cammer* at 1287.

[19]   Hallman Report, ¶3.

market efficiency. A recent study examined whether "the *Cammer and Krogman* factors are sufficient for reliance" and found that the factors had "little relation" even to weak form efficiency, a standard lower than what is required to establish a claim of presumption of reliance under fraud-on-the-market theory, *viz.,* semi-strong form efficiency.[20] As I discuss in Section III.D below, the presence of some of these *Cammer* and *Krogman* factors that Dr. Hallman discusses — absent "empirical facts showing a cause and effect relationship between unexpected corporate events or financial releases and an immediate response in the stock price" — also does not establish market efficiency.

A.   **Economists Use Event Studies and Statistical Significance Testing to Assess Market Efficiency.**

24.   To determine if a stock trades in an efficient market, financial economists often use a statistical technique of hypothesis testing, known as an event study.

25.   An event study is "rooted in the basics of scientific methodology: first a hypothesis is proposed and then a test is conducted to see if that hypothesis can be rejected."[21] Specifically, an event study uses statistical methods to test the hypothesis that an identified news event had no effect on the stock's price. This is commonly called the "null" hypothesis.

26.   To test the null hypothesis, one must calculate the stock's "abnormal return." The abnormal return is the change in stock price following the identified event, adjusted for contemporaneous market and industry effects.[22] As I explain below, the null hypothesis can only be rejected if the abnormal return is statistically significant.

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[20]   Erenburg, Grigori, Janet Kiholm Smith and Richard L. Smith (2011), "The Paradox of 'Fraud-on-the-Market Theory': Who Relies on the Efficiency of Market Prices?" *Journal of Empirical Legal Studies*, Volume 8, Issue 2, pages 260-303.

[21]   Tabak, David "Use and Misuse of Event Studies to Examine Market Efficiency," NERA Economic Consulting, April 2010, [henceforth "Tabak (2010)"] page 4.

[22]   Tabak (2001), page 19-2. Dr. Hallman concedes that he has made no such industry adjustment in his event study in this case [Hallman Dep., 284:18] while he did do so in the Hallman ArthroCare Report [Hallman Dep., 286:14 – 18].

27.   To demonstrate a cause and effect relationship using an event study, one must first be able to reject the null hypothesis, *i.e.,* rule out the possibility that the abnormal return was indistinguishable from zero (or attributable to chance alone rather than the identified news event) with an acceptably high degree of certitude.

28.   The steps of an event study are as follows. One must first review and select the relevant news to be examined.[23] As Tabak (2010) explains, "the relevant academic literature is clear: first one identifies news and then measures price movements associated with that news."[24] The next step in an event study is to establish the event window, which is the period over which the potential impact of news on the stock's price is assessed.[25] For instance, Dr. Hallman uses a one-day event window.[26]

29.   After identifying relevant events and establishing the appropriate event windows, a proper event study must attempt to isolate the portion of the stock's observed price change that is not attributable to market and industry effects, *i.e.*, calculate the stock's abnormal return. As Bodie *et al.* notes, a stock's price on any day could be affected by "a wide range of economic news such as updated forecasts for GDP [Gross Domestic Product], inflation rates, interest rates, or corporate profitability."[27] Therefore, "[i]solating the part of a stock price movement that is attributable to a [company-]specific event is not a trivial exercise."[28]

30.   As noted in Tabak and Dunbar (2001), a study cited by Dr. Hallman, the calculation of abnormal returns is accomplished by estimating "a predicted stock price return, or percentage change, from the day before the news reaches the market to the day the stock

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23   Tabak (2010) at page 4; also see Tabak, David I. and Frederick C. Dunbar (2001), "Materiality and Magnitude: Event Studies in the Courtroom," in Litigation Services Handbook: The Role of the Financial Expert, Third Edition, ed. by Roman L. Weil, Michael J. Wagner and Peter B. Frank, John Wiley & Sons, Inc. USA henceforth, "Tabak and Dunbar (2001)" at 19-4 (cited by Dr. Hallman at Hallman Report at ¶17, n. 22).

24   Tabak (2010), page 4.

25   Tabak and Dunbar (2001), page 19-4.

26   Hallman Report, Table 1 shows Freddie Mac's abnormal return over one-day periods following events.

27   Bodie, Zvi, Alex Kane and Alan J. Marcus, (2011), *Investments*, McGraw-Hill Irwin, New York, NY; henceforth "Bodie *et al.*" at page 353; cited in Hallman Report, footnote 6, page 5.

28   Bodie *et al.*, page 353.

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price assimilates the news, using a [regression] model that takes into account market and industry effects on stock price returns … [and subtracting] the predicted return from the actual return to compute the so-called abnormal return."[29] Further, a central assumption in using regression models to predict returns is that the volatility remains unchanged over the relevant period.[30] As I explain later, Dr. Hallman's conclusions are speculative because he fails to account for the heightened volatility during the global credit crisis (which began August 9, 2007).

31.   After the stock's abnormal return is calculated, one must assess its statistical significance to determine if the null hypothesis can be rejected. As Tabak and Dunbar (2001) note: "Typically, the predicted return does not exactly equal the actual return even when no event has occurred. To decide whether the difference between the actual and the predicted return [the abnormal return] … results merely from chance, one tests for statistical significance."[31]

32.   An abnormal return is considered "statistically significant" when the likelihood that it occurred purely as a matter of chance is small. [32] On the other hand, if a stock's abnormal return is statistically indistinguishable from zero, it is deemed to be "statistically insignificant." In such a case, the event study's null hypothesis cannot be rejected.[33] That is, where the results of the event study are statistically insignificant, they cannot support the conclusion that the identified news caused any stock price reaction.[34]

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[29]   Tabak (2001), page 19-2.

[30]   Kennedy, Peter, *A Guide to Econometrics*, 5th edition. MIT Press, pages 47-48.

[31]   Tabak and Dunbar (2001), page 19-3, Bodie *et al.*, page 354.

[32]   "In general, a test of significance aims to answer the question of whether an observed difference is real or simply occurred by chance." [Mitchell, Mark L. and Jeffry M. Netter (1994), "The Role of Financial Economics in Securities Fraud Cases: Applications at the Securities and Exchange Commission," *The Business Lawyer,* Vol. 49; henceforth "Mitchell and Netter (1994)," page 564.]

[33]   Kaye and Freedman, Judicial Reference Guide, page 251.

[34]   Tabak and Dunbar (2001), page 19-3.

33.   In layman's terms, event study results that are not statistically significant cannot form the basis for a conclusion that the market for a security was efficient.[35]

34.   To determine the statistical significance of an abnormal return, economists first calculate how large the abnormal return is relative to its historical fluctuation. This standardized measure of the abnormal return is referred to as a t-statistic.[36] To check if a stock price reacted significantly following an event, economists measure the stock's t-statistic following the event and calculate what is known as its *p*-value, which is the probability that the observed t-statistic (and the associated abnormal return) could be due to chance alone.[37] Conventionally, if the *p*-value is less than 5% (the conventional significance level threshold), one can reject the possibility that the abnormal return was due to chance alone and conclude that the abnormal return is statistically significant at a 95% confidence level.[38]

35.   As noted above, the null hypothesis in an event study is that there is <u>no</u> cause and effect relationship between material information and stock price reaction. In mathematical terms, this means that the null hypothesis is that the abnormal return following an event is zero.[39] Therefore, such a hypothesis is rejected if the t-statistic is either positive or negative to a statistically significant degree that rules out the possibility that it was attributable to chance alone, *i.e.*, if the t-statistic lies at either of the two tails of the bell curve. A test that examines if the variable of interest (in this case the t-statistic) lies at either tail of the bell curve is referred to as a "two-tailed" test.

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[35]   Tabak and Dunbar (2001), page 19-3.

[36]   The t-statistic is defined as a ratio, which is calculated by dividing the abnormal return by its volatility ("standard error"). Consequently, if the abnormal return is zero, so is the t-statistic. [Mark P. Kritzman (1994), "What Practitioners Need to Know About Event Studies," *Financial Analysts Journal*, pages 17 -20].

[37]   "In general, a test of significance aims to answer the question of whether an observed difference is real or simply occurred by chance." [Mitchell and Netter (1994), page 564.]

[38]   "In general, a test of significance aims to answer the question of whether an observed difference is real or simply occurred by chance." [Mitchell and Netter (1994), page 564.]

[39]   MacKinlay, A.C., 1997, "Event Studies in Economics and Finance," Journal of Economic Literature 35, pages 13-39 [henceforth "MacKinlay (1997)"].

36.   The null hypothesis in a market efficiency test is that there is no cause and effect relationship. So if this hypothesis is true then it means that the stock's price reaction to news may be positive or negative, or indistinguishable from zero, regardless of the nature of the news. Therefore, it is incorrect to reject the null hypothesis by presuming that the stock price will react in a particular direction and then check if the reaction was strong enough to be considered significant, as Dr. Hallman has done by using a one-tailed test (which examines if the t-statistic lies only at one tail of the bell curve).

37.   Generally, economists do <u>not</u> reject the null hypothesis unless the abnormal return's two-tailed *p*-value is less than 5%.[40]   At his deposition, Dr. Hallman agreed with this statement.[41]   A textbook that Dr. Hallman has used for many years to teach college courses, *Bodie et al.*, makes the same point. As it states: "The conventional cutoff for statistical significance is a probability of less than 5%, which requires a t-statistic of about 2.0."[42]

38.   Once the stock's abnormal return is found to be statistically significant using a two-tailed test, it is then necessary to confirm that it was in the right direction in order to conclude that a cause and effect relationship existed between material news and the stock's price. That is, the abnormal return must be significantly positive following the release of good news that is expected to increase the stock's value, and significantly negative following the release of bad news that is expected to decrease the stock's value.

39.   Therefore, after confirming that a stock's abnormal return following an event is statistically significant, one must also ensure that the abnormal return is in the logical direction in order to establish the cause and effect relationship. If the abnormal return is statistically significant but (i) positive following the release of bad news; or (ii) negative following the release of good news, then the evidence contradicts the claim that the stock trades in an efficient market.

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[40]   See Kaye and Freedman, Judicial Reference Guide, page 251.

[41]   Hallman Dep., 67: 3 - 7.

[42]   Bodie *et al.*, page 257; Hallman Dep., 66: 18 - 67: 7.

40. I note that, in his expert report in the only other case in which he has provided an expert opinion on market efficiency,[43] *In re ArthroCare Corp. Securities Litigation* dated May 20, 2011 ("Hallman ArthroCare Report"), Dr. Hallman used the two-tailed test and a 5% level of confidence as the appropriate approach.[44] Dr. Hallman also testified that in all of the event studies that he previously performed (approximately 50),[45] he cannot recall ever before using as the cutoff for statistical significance a one-tail p-value of 10%, which is the equivalent of a two-tailed p-value of 20%.[46] Dr. Hallman could not identify in his deposition any authority for doing so.[47]

41. Likewise, in another securities case, the *TyCom Ltd. Securities Litigation* (which was consolidated in the *In re Tyco International, Ltd. Multidistrict Litigation*), Dr. Hallman submitted an expert report ("Hallman TyCom Report") in which he set forth the results of an event study drawing conclusions using a 5% cutoff for statistical significance.[48]

42. Holding the t-statistic value constant, the *p*-value of a two-tailed test is twice as large as that of a one-tailed test. Dr. Hallman uses a one-tailed *p*-value test to assess if Freddie Mac's stock reacted to news on 6 Analyzed Dates. Consequently, as I explain later, his test is designed to increase the odds of reaching his stated conclusion, *i.e.*, designed to increase the odds of rejecting the null hypothesis (that there is no cause and effect relationship between news and stock price reactions).

B. Dr. Hallman's Event Study Does Not Support a Finding That Freddie Mac's Stock Price Reacted Quickly and Logically to Unexpected Material News.

43. In his event study, Dr. Hallman analyzed Freddie Mac's purported price reaction to "news vs. expectations" on six Analyzed Dates.[49] Dr. Hallman's event study shows that

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[43] Hallman Dep., 10:13-20.

[44] Hallman Dep., 166: 12 - 21; Hallman ArthroCare Report attached as Appendix 3.

[45] Hallman Dep., 193:23-25.

[46] Hallman Dep., 151: 11 – 16.

[47] Hallman Dep., 151: 11 – 16.

[48] Hallman Dep., 140: 11 - 141: 8; Hallman TyCom Report attached as Appendix 4.

[49] The Analyzed Dates in Dr. Hallman's event study are October 3, 2006, January 5, 2007, March 23, 2007, June 14, 2007, August 30, 2007, and November 20, 2007. See Hallman Report, Table 1.

Freddie Mac's abnormal return was <u>not</u> statistically significant on four of the six Analyzed Dates at the 95% confidence level, as the associated *p*-values were greater than 5%.[50] In fact, Freddie Mac's abnormal return was not even statistically significant at a 10% level using a one-tailed test that Dr. Hallman incorrectly applied. Thus, Dr. Hallman's results taken at face value, at best demonstrate that Freddie Mac's stock price reacted to news in a statistically significant manner on only two days, both of which occurred after the onset of the global financial crisis (August 30, and November 20, 2007). During the Class Period, there were 330 trading days. Showing that the stock price reacted significantly to news on two out of 330 trading days, or 0.61% of trading days, in the Proposed Class Period does not prove that Freddie Mac's stock traded in an efficient market throughout the Proposed Class Period. Further, Dr. Hallman has failed to control for industry effects and heightened volatility in the credit crisis period. Correcting for such errors, as I explain later, Freddie Mac's abnormal return on August 30, 2007 is also not statistically significant (under the two tailed test and 5% significance level).

44.   Dr. Hallman chose the six Analyzed Dates based on his view that those dates were likely dates where material news entered the market. As he explains in the Hallman Report:[51]

> The standard event study methodology is well suited to analyze the stock price reaction around Freddie's earnings announcements during the class period to test for a cause and effect relationship between financial news releases and stock returns, because earnings announcements are events where Freddie Mac releases new financial information to the market.

45.   Dr. Hallman reports the results of his event study in Table 1, set forth on page 14 of the Hallman Report. I produce that same information in that Table below, adding an additional column on the far right indicating the two-tailed *p*-values that correspond to the one-tailed p values that Dr. Hallman reported for each event.[52] In his deposition, Dr.

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[50]   Hallman Report, Table 1; Hallman Dep., 149: 16 - 21. These four dates are October 3, 2006; January 5, 2007; March 23, 2007; and June 14, 2007. The two remaining dates that Dr. Hallman analyzed are: August 30, 2007 and November 20, 2007.

[51]   Hallman Report, ¶18.

[52]   Hallman Report at p. 14, Table 1.

Hallman confirmed his understanding that, holding other factors constant, two-tailed p-values are always twice the amount of the one-tailed p-value for the same event, which is correct.[53]

Calendar Date	News Vs. Expectations	Release Title	Period Covered	Abnormal Return	One-tail p	Two-tail p
10/3/06	Positive	"Freddie Mac Provides Market Update"	H1 06	1.2%	11.9%	23.8%
1/5/07	Weakly Negative	"Freddie Mac Provides Quarterly Market Update"	Q3 06	-1.0%	16.3%	32.6%
3/23/07	In-Line	"Freddie Mac Reports 2006 Financial Results"	2006	0.2%	44.2%	88.4%
6/14/07	Negative	"Freddie Mac Releases First Quarter 2007 Financial Results; Company Resumes Quarterly Reporting"	Q1 07	-1.3%	10.7%	21.4%
8/30/07	Negative	"Freddie Mac Releases Second Quarter 2007 Financial Results; Net Income of $764 Million, Fair Value Increase of $800 Million"	Q2 07	-4.7%	0.0%	0.0%
11/20/07	Negative	"Freddie Mac Reports Third Quarter 2007 Net Loss of $2.0 Billion or $3.29 Per Diluted share"	Q3 07	-29.0%	0.0%	0.0%

46.   As Dr. Hallman notes and I agree, the very definition of the semi-strong form efficient market is "a market in which stock prices reflect all publicly available information, and stock prices react quickly to new material information (news) regarding stock value."[54] If stock prices do not promptly respond to such unexpected news, the market for that stock is not efficient.[55]

47.   Further, as I noted above, *p*-values can be determined using a one-tailed or two-tailed test. For a given t-statistic value, a two-tailed p-value is double that of a one-tail p-

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[53]   Hallman Dep., 61:25 – 62:5.

[54]   Hallman Report, ¶8.

[55]   Tabak, David (2010), page 9. (Noting "A response on the day after news sounds like a potential effect of an inefficient market that incorporates news slowly.")

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value.[56] Thus, a two-tailed *p*-value of 5% equals a one-tail *p*-value of half that amount, or 2.5%. Likewise, a one-tailed p-value of 10% equals a two-tailed *p*-value of twice that amount, or 20%. As the *p*-value measures the probability that the stock's abnormal returns could be due to chance alone, it follows that using a one-tailed test (as Dr. Hallman employed in this case) increases the odds of rejecting the null hypothesis. For instance, using the conventional significance level cutoff of 5%, if a stock's abnormal return has a two-tailed p-value of 7%, then one could not reject the null hypothesis that the stock did <u>not</u> trade in an efficient market using a two-tailed test. However, using a one-tailed test, one would draw the opposite conclusion (as the one-tailed p-value in this case would be 3.5%, which is less than the convention cut-off of 5%).

48.   Indeed, as noted above, "the conventional cutoff for statistical significance is a probability [or two-tail *p*-value] of less than 5%," which equates to a one-tailed *p*-value of 2.5%.[57] In the Hallman ArthroCare Report, the only other case in which he has provided an expert opinion on market efficiency,[58] Dr. Hallman used the two-tailed test and a 5% level of confidence as the appropriate approach which is four times more stringent than the approach he used here.[59]

49.   Of the six Analyzed Dates, Dr. Hallman's event study shows that abnormal returns for four of those dates were not statistically significant even under the weak standard of a one-tailed *p*-value test at a 95% confidence level. Specifically, Dr. Hallman has calculated one-tailed *p*-values of 11.9%, 16.3%, 44.2% and 10.7% for Freddie Mac's first four earnings releases during the Proposed Class Period.[60] These results equate to two-tailed *p*-values of 23.8%, 32.6%, 88.4% and 21.4% as shown in the table above. The abnormal returns for these corresponding dates are <u>not</u> statistically significant because their p-values are all more than four times the conventional two-tail *p*-value cutoff of 5%.

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[56]   Kaye and Freedman, Judicial Reference Guide, page 255.

[57]   Bodie *et al.*, page 257.

[58]   Hallman Dep., 10:13-20.

[59]   Hallman Dep., 166: 12 - 21.

[60]   Hallman Report, Table 1. I have bolded the results on these four dates in Table 1 above.

50.   As Dr. Hallman testified at deposition, his own event study results show that Freddie Mac's abnormal return was <u>not</u> statistically significant on these four dates.   More specifically, Freddie Mac's abnormal return on these four dates was not statistically significant at conventional significance cutoff levels,[61] or even "close to traditional and accepted measures of statistical significance"[62] such as he had used in the Hallman ArthroCare Report (namely, a two-tailed *p*-value test and statistical cutoff of 5%).[63] Further, correcting for Dr. Hallman's failure to adjust for heightened volatility and industry effects, I found that Freddie Mac's abnormal return on August 30, 2007 is also not statistically significant (under the two tailed test and 5% significance level), as I explain later.

51.   On four of the six dates he tested, Freddie Mac's abnormal return had a one-tail *p*-value of over 10% (which is the equivalent of a two-tail *p*-value of over 20%). Again, as the academic literature makes clear in discussing two-tailed tests, "[t]he conventional cutoff for statistical significance is a probability [*p*-value] of less than 5%."[64]   Thus, Dr. Hallman's results establish that four events had two-tailed *p*-values of over 20%, which is four times the "conventional cutoff for statistical significance."[65]   Indeed, as Dr. Hallman conceded at his deposition, even when using as the cutoff for statistical significance the one-tailed p-value of 10% (which Dr. Hallman admitted he never used before and had not seen used), the result for those same four of six events he tested lacked statistical significance. In other words, those four events lacked statistical significance even when using as a cutoff for statistical significance a value that is four times the one used in the Hallman ArthroCare Report when opining on the market efficiency issue.

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[61]   Hallman Dep., 148: 17 - 149: 4.

[62]   Hallman Report, ¶27.

[63]   Hallman Dep., 232: 6 - 14.

[64]   Bodie *et al.* at 257.

[65]   Bodie *et al.* at 257.

52.   That is, the possibility that Freddie Mac's price change on each of those four dates was due to chance alone cannot be ruled out at the conventional confidence level that such studies require and that Dr. Hallman has adopted in previous reports.

53.   I am familiar with a couple of judicial decisions, where courts have rejected event studies like Dr. Hallman's. In *PolyMedica,* plaintiff's expert had found that the stock price reacted significantly to news on five (or 3.13%) of 160 trading days in the contested period in that case.[66] However, the Court opined that a "mere listing of five days on which news was released and which exhibited large price fluctuations proves nothing."[67] That is, in *PolyMedica* the Court concluded that even five times (=3.13/0.61) as much evidence that Dr. Hallman has produced in this case "proves nothing."[68]

54.   In *Freddie Mac Kreysar* the court stated that: "A plaintiff must show that the market price responds to **most** new, material news."[69] In that case, the plaintiffs' expert, Dr. Craig McCann, offered an opinion that the market for Freddie Mac's Series Z preferred securities was efficient between November 29, 2007 and September 6, 2008 according to two event studies.[70] At his initial deposition, Dr. McCann testified that "if new information had been released into the market on each of his initial 28 event days, one could expect to see statistically significant abnormal returns on **each** of the 28 days in an efficient market."[71] I was the expert for the defendants in that case, and the court noted that I had testified that "an economist may conclude that a market is efficient if it reacts to news *80 to 90% of the time*, depending on the number of news dates at issue."[72]

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[66]   Memorandum and Order, In Re *PolyMedica Corp. Securities Litigation*, United States District Court, District Of Massachusetts, 1: 00-cv-12426-WGY, September 28, 2006; henceforth "*PolyMedica District Court Opinion"*, pages 1 and 15.

[67]   *PolyMedica District Court Opinion*, page 15.

[68]   *PolyMedica District Court Opinion*, page 15.

[69]   Opinion, *In Re Federal Home Loan Mortgage Corp. (Freddie Mac) Securities Litigation*, United States District Court, Southern District Of New York, 09 Civ. 832 (Mgc), 09 Md 2072 (Mgc), March 27, 2012; henceforth "*Freddie Mac Kreysar Opinion,*" page 18.

[70]   *Freddie Mac Kreysar Opinion,* page 13.

[71]   *Freddie Mac Kreysar Opinion,* page 19.

[72]   *Freddie Mac Kreysar Opinion,* page 19.

55. Based on his two event studies, McCann generated results similar in a key way to Dr. Hallman's results. There, Dr. McCann had analyzed nearly ten times as many dates (57 "news days") as Dr. Hallman does here. He found statistically significant abnormal returns on 28% of the news days he examined, using a two-tailed test with a 5% *p*-value cutoff for statistical significance.[73] Holding that showing to be insufficient, the court explained: "Even accounting for market 'noise' — extraneous circumstances and confounding effects — McCann's showing that the market reacted to news only 28% of the time is insufficient to satisfy the most important *Cammer* factor, the cause and effect relationship between unexpected news and price."[74]

56. Here, Dr. Hallman has analyzed only six dates, and he has found that Freddie Mac's price reacted statistically significantly to news on only two of those dates (which constitutes less than 1% of the 330 trading days in the Proposed Class Period, and only 33% of the dates he chose to test). Further, Dr. Hallman's event study is defective as he fails to control for industry effects and heightened volatility post August 9, 2007. As I explain later, accounting for these factors, Freddie Mac's abnormal return on August 30, 2007 was not statistically significant using a two-tailed test and 5% significance level. Such results do not show that the market price for Freddie Mac stock responded to "most new, material news."[75]

57. Dr. Hallman's results are inconsistent with his opinion that the market for Freddie Mac's stock was semi-strong form efficient throughout the Proposed Class Period. Contrary to his claim, Dr. Hallman's event study results do not even suggest, let alone demonstrate, that Freddie Mac's stock traded in an efficient market throughout the Proposed Class Period.[76]

58. For the reasons discussed in detail below, it is my opinion that Dr. Hallman's event study is flawed and unreliable. As I noted above, however, even taking his results at face

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[73] *Freddie Mac Kreysar Opinion,* page 17.

[74] *Freddie Mac Kreysar Opinion*, page 19.

[75] *Freddie Mac Kreysar Opinion,* page 18.

[76] Hallman Report, ¶3.

value, his study shows that the market for Freddie Mac stock was <u>not</u> semi-strong form efficient. To the extent that any logical conclusion can be drawn from Dr. Hallman's test results, it is that <u>no</u> consistent cause and effect relationship existed between Freddie Mac-related events and movements in Freddie Mac's stock price during the Proposed Class Period.

59.   As set forth below, Dr. Hallman's report suffers from many flaws. However, an economist needs only to review Dr. Hallman's calculated *p*-values to know that his report cannot support a conclusion that the market for Freddie Mac common stock was semi-strong form efficient during the Proposed Class Period. Rather, his statistical results support the opposite conclusion, *i.e.*, Freddie Mac stock did not trade in an efficient market. That is because, as discussed further below, even using flawed event study methodologies, Dr. Hallman finds that Freddie Mac's stock price reacted statistically significantly to news on only two dates in the entire 330 trading day-class period. No reliable conclusion respecting the efficiency of a market throughout a 330-day trading period can possibly be based on evidence related to two days.

C.   Dr. Hallman's Event Study Analysis Is Fundamentally Flawed, And Consequently Its Results Are Unreliable.

Flaw 1: Dr. Hallman claims that statistical significance is not a necessary element of an event study.

60.   As Dr. Hallman has acknowledged in his deposition, his own event study results show that Freddie Mac's abnormal return was <u>not</u> statistically significant on four of the six Analyzed Dates at conventional significance cutoff levels,[77] or even "close to traditional and accepted measures of statistical significance"[78] such as he had used in the Hallman ArthroCare Report (namely, a two-tailed *p*-value test and statistical cutoff of 5%). Indeed, the results for those four dates even exceeded the 10% one-tail p-value cutoff that Dr. Hallman used for the first time in his report here. Thus, Dr. Hallman's results do not support the finding that Freddie Mac's stock traded in a semi-strong form efficient market through the Proposed Class Period.

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[77]   Hallman Dep., 148: 17 - 149: 4; 149: 16 - 21.

[78]   Hallman Report, ¶27.

61.   Nevertheless, in an attempt to validate his purported event study analysis, Dr. Hallman claims that the *Cammer* and *Krogman* decisions do not require the stock's price reaction to be statistically significant to establish a cause and effect relationship.[79] He repeated this claim in his deposition, stating that he "doesn't think that statistical significance … makes sense as a condition of market efficiency."[80] Such an assertion has no economic basis and violates the well-established statistics and economic principles on which event studies are grounded.

62.   Dr. Hallman claims that market efficiency was "something that got tested a number of times in the '70s", but that it is no longer tested in academic studies.[81] To the contrary, over 7,000 papers on market efficiency and event studies have been published in leading academic journals since the 1970s[82] and more than 6,500 papers have been posted to the leading repository of latest research papers.[83]   Dr. Hallman's claim that statistical significance of abnormal returns is not necessary for testing market efficiency[84] is incorrect as even a basic text on the subject notes.[85]

63.   As Dr. Hallman acknowledged in his deposition, absent a cause and effect relationship between material news about a company and movements in its stock price, a semi-strong form efficient market cannot exist for the trading of its stock.[86] A statistical technique,

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[79]   Hallman Report, ¶27.

[80]   Hallman Dep., 46: 21 – 47: 3.

[81]   Hallman Dep., 114: 20 – 115: 7.

[82]   There are 7,495 published academic papers in the English language on "information and market efficiency as well as event studies" [i.e., classified under Journal of Economic Literature Classification Code G14] according to EconLit (a comprehensive index of research publications maintained by American Economic Association).

[83]   Social Sciences Research Network (SSRN) listed 6967 papers in the "Capital Markets: Market Efficiency Journal" that were Posted to the database in year 2000 or later. SSRN is a worldwide collaborative of over 212,000 authors and more than 1.3 million users that is devoted to the rapid worldwide dissemination of social science research and has been named the Number 1 Open Access Repository in the World for April, 2012 by the Ranking Web of World Repositories.

[84]   Hallman Report, ¶27 and Hallman Dep., 152: 23 - 25.

[85]   Damodaran, Aswath, Investment Valuation: Tools and Techniques for Determining the Value of Any Asset, Second Edition, Wiley.

[86]   Hallman Dep., 79: 9 - 15.

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called an event study,[87] is used to determine whether such a cause and effect relationship exists. As Dr. Hallman conceded, in a statistical test such as an event study, no reliable conclusion can be based on any test results that lack statistical significance.[88] Such test results do not eliminate to any reliable degree of confidence the possibility that the abnormal stock price movement resulted from chance.[89] For this reason, it is not possible to form a valid conclusion about the market efficiency of a stock from an event study unless the study yields enough statistically significant price reactions to news in the correct direction from which one can draw reliable statistical conclusions. Dr. Hallman's study did not come close to doing so.

64. In his deposition, Dr. Hallman conceded that, if an abnormal return is not statistically significant, then the possibility that it is due to chance alone cannot be rejected with an acceptable degree of certitude.[90] Consequently, it is incorrect from an economic perspective to claim that the abnormal return on a given date was caused by some "unexpected corporate event," if the abnormal return is not statistically significant.[91] One cannot validly ascribe an explanation to an event study result that is not statistically significant because it may have resulted from chance alone.[92] Dr. Hallman's claim thus violates the economic logic of the *Cammer* and *Krogman* decisions.

65. In fact, in *Krogman*, the Court rejected the plaintiff expert Miller's attempt to prove that there was a cause and effect relationship between CIC's stock price and unexpected news

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[87] Hallman Dep., 192: 11 -21.

[88] Hallman Dep., 93: 5 - 13.

[89] Hallman Dep., 45: 22 - 46: 8; 57: 5 - 11; 189: 20 - 25; 196: 13 - 18.

[90] Hallman Dep., 57: 5 - 11; 196: 13 - 18.

[91] *Cammer* at 1287.

[92] Hallman Dep., 58: 8 - 12; "In general, a test of significance aims to answer the question of whether an observed difference is real or simply occurred by chance." [Mitchell, Mark L. and Jeffry M. Netter (1994), "The Role of Financial Economics in Securities Fraud Cases: Applications at the Securities and Exchange Commission," *The Business Lawyer,* Vol. 49; henceforth "Mitchell and Netter (1994)," page 564.]

by identifying a "correlation between CIC's stock price and the news about CIC reported in ninety-five news articles."[93] The Court concluded:[94]

> Because the Plaintiff has failed to show any reliable relationship between changes in CIC's stock price and news events, the Court concludes that this factor weighs heavily against a finding of market efficiency.

66. Similarly, the Court in the *Freddie Mac Kreysar Opinion* held: "In an efficient market, stock prices should show **statistically significant abnormal returns** on days in which unexpected, material information is released into the market."[95]   At deposition, Dr. Hallman admitted that, to provide a basis for drawing a reliable conclusion, test results must be statistically significant. He testified:[96]

> Q. Then you would decide whether the difference between the actual return and the predicted return results merely from chance, correct?
>
> A. Right. You would get a P value and see what likelihood, what is the likelihood of getting that abnormal return, if the true value were zero.
>
> Q. So you test the abnormal return for statistical significance, correct?
>
> A. Yes. Yes. You report a P value.

He testified:[97]

> Q. Now, in order for a statistical test result to provide a basis for drawing a reliable conclusion, that result must be statistically significant, right?

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[93] *Krogman*, page 16.

[94] *Krogman*, pages 16-17.

[95] *Freddie Mac Kreysar Opinion*, page 12.

[96] Hallman Dep,, 45: 22 - 46: 8.

[97] Hallman Dep., 93: 5 - 13.

> A. Yeah. If you want to say that I ran this test and that abnormal return is statistically significant different from zero, then [you would] have to have a statistically significant result.

67. In my entire career, I have never reviewed an event study that rejected statistical significance as an essential element of the study. As I discussed above, in the event studies Dr. Hallman himself proffered as part of his expert reports in the *ArthroCare* and *TyCom* cases, he included an assessment of statistical significance. I have attached his expert reports in those two matters as Appendices 3 and 4.

Flaw 2: Dr. Hallman ascribes significance to statistically insignificant abnormal returns.

68. In his report in this case, Dr. Hallman states that three of the six events he analyzed "have results that are **close** to traditional and accepted measures of statistical significance with one-tailed *p*-values above 10% but below 20%."[98] (There is a fourth event with a *p*-value of 44.2%.)

69. Dr. Hallman fails to provide any support for this assertion, and he fails to explain how his results are "close" to conventional measures of statistical significance. Notably, Dr. Hallman testified that he is not aware of any authority that supports even the use of a one-tailed *p*-value of 10% as the cutoff for statistical significance in an event study test of market efficiency.[99] Further, he cannot identify a single expert report he has ever prepared where he used a one-tailed *p*-value of 10% as the cutoff for statistical significance.[100]

70. As I explained above, economists generally consider one-tailed *p*-values of 5% or greater to be weak evidence of statistical significance. Dr. Hallman's results (one-tailed *p*-values of 10.7%, 11.9% and 16.3%)[101] are not "close" to "traditional and accepted measures of statistical significance." They all substantially exceed the two-tailed conventional cutoff

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[98] Hallman Report, ¶27 (emphasis added).

[99] Hallman Dep., 151: 19 - 24.

[100] Hallman Dep., 157: 9 - 15.

[101] Hallman Report, ¶27.

for statistical significance, which is a two-tailed *p*-value of 5% (which equates to a one-tailed *p*-value of 2.5%). Nor could Dr. Hallman cite any academic or legal authority that permits an event study to ascribe statistical significant to results that fall outside of, but are allegedly close to, the cutoff for statistical significance.[102]

71.   At deposition, Dr. Hallman conceded that Freddie Mac's abnormal returns on four of the six dates that he tested were not statistically significant.[103] In addition, at deposition, Dr. Hallman testified that he does not regard a *p*-value of 20% or more to be close to a *p*-value of 5% or less.[104] As Dr. Hallman admitted when questioned, results that are more than four times greater than the cutoff for statistical significance that he himself used in the Hallman ArthroCare Report (*i.e.*, a two-tailed test at 5%) are not close to statistically significant.[105]

72.   That is the case here. According to Dr. Hallman's own event study results, Freddie Mac's abnormal returns' two-tailed *p*-values are at least 400% of the conventional significance cut-off of a two-tailed *p*-value of 5%[106] for four of the six Analyzed Dates.

73.   In addition, Dr. Hallman's observation that these results are "close" ignores the purpose of assessing statistical significance — to establish a quantifiable measure that can distinguish between occasions on which a hypothesis is proven and occasions on which it is not. As Dr. Hallman concedes, a statistically insignificant abnormal return is statistically indistinguishable from zero.[107]

74.   As noted above, Tabak and Dunbar (2001) explain the purpose of statistical significance testing in an event study: "To decide whether the difference between the actual and the predicted return … results merely from chance, one tests [the abnormal return] for

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[102]   Hallman Dep., 74: 6 – 14.

[103]   Hallman Dep., 149: 16 - 21.

[104]   Hallman Dep., 72: 9 - 13.

[105]   Hallman Dep., 150:17 - 24.

[106]   Hallman Dep., 148:17 - 24.

[107]   Hallman Dep., 57: 5 – 15; 196: 13 – 18.

statistical significance."[108] If a stock's abnormal return is not statistically significant following an event, the reaction could have occurred <u>even absent the identified event</u>[109] and thus, it is meaningless from an economic perspective to assign a "direction" (positive or negative) to the abnormal return. At his deposition, Dr. Hallman admitted that the direction of a statistically insignificant abnormal return is meaningless from a statistical perspective, and that he cannot identify any economic literature that supports the approach of assigning the logical direction to a statistically insignificant abnormal return.[110]

75.   When asked about the quote above from Tabak and Dunbar (2001) at his deposition, Dr. Hallman testified as follows:[111]

> A: Quote, "Typically, the predicted return does not exactly equal the actual return, even when no event has occurred. To decide whether the difference between the actual and the predicted return (the CAR) results merely from chance, one tests the CAR for statistical significance as described in Section 9.4A." Do you see that?
>
> A.   Yes.
>
> Q.   Okay. Do you agree with that sentence?
>
> A.   Yeah. Sure.
>
> A.   So then the event study seeks to determine whether or not the abnormal return was merely the result of chance or not, correct?
>
> A.   Sure. I mean, I can live with this wording, too, yes. These guys know what they are doing.
>
> Q.   Now a statistically insignificant abnormal return does not reject the null hypothesis, correct?
>
> A.   That's correct, yes.

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[108]   Tabak and Dunbar (2001), page 19-3, Bodie *et al.*, page 354.

[109]   Tabak and Dunbar (2001), page 19-3, Bodie *et al.*, page 354.

[110]   Hallman Dep., 195:3 – 196.12.

[111]   Hallman Dep., 56: 16 - 57: 15.

76.   Properly interpreted, the results of Dr. Hallman's own event study analysis show that Freddie Mac's stock price did not react (positively or negatively) to the identified news on four of the six Analyzed Dates, out of a total of 330 trading days in the Proposed Class Period. Thus, Dr. Hallman's own event study analysis does not even suggest, let alone demonstrate, that a cause and effect relationship existed between Freddie Mac's stock price movements and the news on four of the six days he chose to analyze, because the price reaction of Freddie Mac's stock on those dates was not statistically significant.

Flaw 3: Dr. Hallman's one-tailed test of statistical significance is a biased and inappropriate standard.

77.   As I noted earlier, in testing market efficiency, the appropriate test is the two-tailed test. That is because the null hypothesis of a market efficiency study is that there is no cause and effect relationship between material information and stock price reaction, and under this null hypothesis, one should not presume that the stock price will change in a particular direction while testing for the existence of the cause and effect relationship.[112]

78.   Dr. Hallman's one-tailed test is biased as it is more likely to find evidence that Freddie Mac stock traded in an efficient market. Dr. Hallman's one-tailed test considers the abnormal return changes only in (what he views, reasonably or not, as) the <u>right</u> direction, and ignores its changes in the "wrong"direction.[113]

79.   Dr. Hallman's test is more likely to find statistical significance compared to a two-tailed test because the p-values under a one-tailed test are half of the p-values under a two-tailed test. Therefore, one-tailed p-value results can sometimes indicate statistical significance (*i.e.*, can be below 5%) at the 95% confidence level while a two-tailed test would not find the exact same abnormal return to be statistically significant. Noting that "[m]any investigators find it tempting to use a one-tailed probability level to facilitate obtaining 'significant' results," a statistics text book recommends that investigators "use

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[112]   Hallman Dep., 98: 9 - 18; 100: 7 - 16.

[113]   Friedman, Herbert (1972), "Introduction to Statistics," Random House, page 146. ("A major problem with the use of one-tailed [p-]values is [that] … outcomes in the opposite (nonpredicted) [*sic*] direction should be ignored.")

two-tailed [*p*-]values" in "virtually all situations."[114]   The Institute for Digital Research and Education at UCLA cautions: "Choosing a one-tailed test for the sole purpose of attaining significance is not appropriate. Choosing a one-tailed test after running a two-tailed test that failed to reject the null hypothesis is not appropriate, no matter how 'close' to significant the two-tailed test was. Using statistical tests inappropriately can lead to invalid results that are not replicable and highly questionable."[115]

80.   In the only other case in which he has provided an expert opinion on market efficiency,[116] Dr. Hallman has used the two-tailed test and a 5% level of confidence as the appropriate approach, a statistical significance level that is four times lower than the level he used here.[117]   In the Hallman ArthroCare Report, he conducted an event study where he used *p*-value tests to calculate the statistical significance of abnormal returns, and he used that study to support his opinion that the market for the securities at issue there was an efficient market.   There, he stated that "**[s]tatistical significance is most typically defined as a [two-tailed] *p*-value less than or equal to 0.05 (5%)**, but is sometimes extended to include *p*-values less than or equal to 0.10 (10%)," which is the equivalent of one-tail *p*-values of 5%.[118] In applying the two-tailed *p*-value, he used 5% as the cutoff for statistical significance.[119]   He also noted that two of the *p*-values he found in that case — 0.1416 (*i.e.*, 14%) and 0.2096 (*i.e.*, 21%) — were "**not statistically significant**."[120]

81.   In the Hallman TyCom Report, Dr. Hallman also set forth the results of an event study drawing conclusions using a 5% cutoff for statistical significance. In that event study, he tested five news events that, he opined, "cause[d] statistically significant negative returns

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[114]   Friedman, Herbert (1972), "Introduction to Statistics," Random House, page 146-47.

[115]   http://www.ats.ucla.edu/stat/mult_pkg/faq/general/tail_tests.htm, downloaded December 10, 2012.

[116]   Hallman Dep., 10:13-20.

[117]   Hallman Dep., 166: 12 - 21.

[118]   Hallman ArthroCare Report, ¶58.

[119]   Hallman 122: 9 - 12; 124: 25 - 125: 6.

[120]   Hallman ArthroCare Report, ¶60.

on TyCom stock," because they "**all have a *p*-value of .05 or lower**."[121] That is, there too, he used as a threshold for statistical significance a *p*-value of 5%.[122]

82. At deposition, Dr. Hallman testified he could not identify a single authority justifying the use of a one-tailed *p*-value test when testing to determine whether or not a market is efficient as he has done in this case.[123] He also testified that using a two-tailed test to assess market efficiency is "illogical".[124] Yet, as set forth above, he used a two-tailed test to assess market efficiency in the Hallman ArthroCare Report, and he believed that the methodology he employed there was not illogical but, rather, scientifically correct in supporting his conclusions.[125] Dr. Hallman admitted at his deposition that in this case he used a one-tailed test (which assigns an expected direction of the stock's price reaction[126] given his subjective assessment of the news that day) and thus was testing a null hypothesis which was "slipperier, not slipperier, gooier"[127] than the one economists actually use to test market efficiency through event studies. In short, Dr. Hallman's testimony on this point was inconsistent.

83. Notably, even using the one-tailed test, Dr. Hallman still fails to identify sufficient statistically significant reactions to news to support his conclusion regarding market efficiency.

> **Flaw 4: Dr. Hallman's conclusion that the stock price "reacted" in the "logical direction" on dates with statistically insignificant abnormal returns is based on a subjective and unscientific news review.**

84. Despite the fact that his own event study demonstrates that Freddie Mac's stock price movements on four of the six Analyzed Dates were not statistically significant, Dr. Hallman concludes that Freddie Mac's stock price reactions on three of these dates were

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[121] Hallman TyCom Report, page 15.

[122] Hallman Dep., 140: 11 - 141: 3.

[123] Hallman Dep., 115: 8 - 18.

[124] Hallman Dep., 100: 12 - 23; 110: 24 - 111: 21.

[125] Hallman Dep., 113: 7 - 12; 116: 19 - 23; 121: 6 - 11.

[126] Hallman Dep., 101:13.

[127] Hallman Dep., 101:11.

"timely and logical."[128] He concludes that the "muted stock price reaction" on the fourth date was "logical" and "consistent with the idea that the market did not believe that Freddie Mac had significant subprime credit exposure."[129]

85. Drawing conclusions about the "direction" of price reactions that are not statistically significant is incorrect from economic and statistical perspectives. Dr. Hallman admitted at deposition that the direction of an abnormal return that is not statistically significant was meaningless from a statistical perspective.[130] He also admitted that he could not cite a single authority in the economics literature that supports assigning a "logical" direction to statistically insignificant results.[131] Yet Dr. Hallman commits such an error repeatedly in his analysis.

86. As set forth above, there is no economic or statistical basis for assigning a "direction" to a statistically insignificant price movement.   Nevertheless, having first incorrectly assigned a "direction" to Freddie Mac's statistically insignificant abnormal return on four of the six Analyzed Dates, Dr. Hallman claims that the "direction" of Freddie Mac's price change was "logical" in each case. Dr. Hallman attempts to support his claim by selectively citing news reports and analysts' commentary that supports his conclusion and ignoring similar evidence that is inconsistent with his conclusion. Dr. Hallman's *ex post* selection of news is neither "logical" nor scientifically valid.[132]

87. To begin, Dr. Hallman's conclusions lack the necessary methodological rigor demanded by an event study. His methodology cannot be replicated, and it is therefore unscientific and his conclusions are unreliable. As Dr. Hallman testified in his deposition, the methodology he used to assign a direction to "news vs. expectations" in Table 1 of his report was based simply on his own subjective "call"[133] regarding the news and analyst

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[128] Hallman Report, ¶¶ 21, 22, and 24.

[129] Hallman Report, ¶23.

[130] Hallman Dep., 191: 18 - 192: 10.

[131] Hallman Dep., 192: 22 - 193: 12.

[132] Hallman Report, ¶¶ 21-24.

[133] Hallman Dep., 144: 13.

commentary on the selected dates and not on "any specific statistical or economic or financial or legal standard." [134] In fact, the arbitrary nature of Dr. Hallman's characterization of news on a particular date (and his conclusions) is evident from his deposition testimony in which he changes his characterization of news on a particular date, but such a change has no impact on his conclusion. Dr. Hallman testified at deposition that he "might have characterized" the news and analyst commentary on June 14, 2007 (one of his six Analyzed Dates) as "weakly negative" instead of "negative" because his re-reading of analyst commentary indicated that there "wasn't a ton of new or revelatory information" that day. [135] Despite his admission, he claims that Freddie Mac's price reaction that day (despite the absence of new information) supports his conclusion that the stock reacted to news. Such a conclusion makes no sense from an economics perspective.

88.   Further, Dr. Hallman ignores evidence that is contrary to his desired result (as I explain in Appendix 5) on each of these four Analyzed Dates, effectively tailoring his methodology to reach any desired conclusion. Dr. Hallman admitted in his deposition that making a "call" to characterize the news on some of the Analyzed Dates "were more difficult than others because … some reports might say in line and some reports might say I don't like it and some reports might say it is fine." [136]

89.   Dr. Hallman's conclusions are merely instances of the *post hoc* fallacy.[137] That is, merely because Dr. Hallman found some positive (or negative) news *ex post* on certain days when Freddie Mac's abnormal returns were positive (or negative), it is a fallacy to conclude the stock's price change was caused by the identified news, as Dr. Hallman asserts.

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[134]   Hallman Dep., 143: 22 – 144: 3.

[135]   Hallman Dep., 40:8-20.

[136]   Hallman Dep., 144: 3-10.

[137]   The Latin term for the fallacy is *post hoc*, *ergo propter hoc* ("After this, therefore because of this") and refers to the incorrect conclusion that if an event of kind A is followed in time by an event of kind B, then A must have caused B.

90.   If I were to ignore the news and commentary that Dr. Hallman selectively identifies and instead proffer only news items and analyst commentary of the opposite sort (*i.e.*, positive rather than negative, or vice versa) which were also present on the dates Dr. Hallman has selectively analyzed, I could equally well assert that Freddie Mac's abnormal returns on these dates were *not* in the logical directions.

91.   Two examples serve to illustrate how Dr. Hallman's approach is subject to error or manipulation. In discussing news on October 3, 2006, Dr. Hallman claims that the news on that date was positive, partially quoting, among other things, a Prudential Equity analyst report, but ignoring the negative aspects of that same report. Even the title of the report highlighted the fact that Freddie Mac's higher than expected GAAP earnings[138] for the first half of 2006 were due to higher interest rates that had "**since reversed**."[139] Consequently, analysts expected Freddie Mac's future earnings to deteriorate due to declining (and publicly observable) interest rates over that period (which ultimately did decline).[140] For this reason, and others, the Prudential Equity analysts' target for Freddie Mac stock's price was "below the historical average."[141] With regard to October 3, 2006, Dr. Hallman makes no mention of this negative information.

92.   Yet, in discussing January 5, 2007, Dr. Hallman claims that nearly identical negative analyst commentary (about Freddie Mac's expected future losses in the fourth quarter of 2006 due to declining interest rates) constitutes "unexpected negative news" that "logically" explains Freddie Mac stock's -1% abnormal return on January 5, 2007.[142]

93.   Likewise, Dr. Hallman selectively relies upon analysts' claims that the results were consistent with expectations. For example, he opts not to assign a "direction" to Freddie

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[138]   GAAP refers to Generally Accepted Accounting Principles. Freddie Mac's earnings were prepared according to GAAP. [Freddie Mac 2005 Annual Report, page 98].

[139]   "FRE: 1H06 Earnings -- GAAP Earnings Surpass Our Expectations Due To Higher Rates In 2q (since Reversed); Stable Outlook on Credit and Interest Rate Risks," *Prudential Equity Group LLC*, October 3, 2006.

[140]   "FRE: 1H06 Earnings -- GAAP Earnings Surpass Our Expectations Due To Higher Rates In 2q (since Reversed); Stable Outlook on Credit and Interest Rate Risks," *Prudential Equity Group LLC*, October 3, 2006.

[141]   "FRE: 1H06 Earnings -- GAAP Earnings Surpass Our Expectations Due To Higher Rates In 2q (since Reversed); Stable Outlook on Credit and Interest Rate Risks," *Prudential Equity Group LLC*, October 3, 2006.

[142]   Hallman Report, ¶¶ 20 and 22.

Mac's positive (but not statistically significant) abnormal return on March 23, 2007, claiming it was "in line with expectations."[143] By contrast, he assigns a negative direction to the negative (but not statistically significant) abnormal return on January 5, 2007, when the very *New York Times* article he cites notes that Freddie Mac's third quarter loss was "in line with analysts' expectations."[144] Dr. Hallman never explains why he draws these inconsistent conclusions, but notably his choices happen to support the result that favors Plaintiff.

94.   As I explain in Appendix 5, Dr. Hallman ignores inconsistent analyst commentary with respect to each of the four Analyzed Dates on which abnormal returns were not statistically significant. As I noted above, Dr. Hallman's methodology is unscientific, as it cannot be replicated, and therefore his conclusions are unreliable.

Flaw 5:   Dr. Hallman's tests of joint statistical significance are flawed, and they fail to demonstrate a cause and effect relationship between unexpected news and Freddie Mac's stock price.

95.   Conceding that he has failed to demonstrate that Freddie Mac's abnormal returns were statistically significant on four of his six Analyzed Dates on an individual basis, Dr. Hallman nevertheless asserts in his deposition that the results of his joint statistical significance tests (F-test and Chi-squared tests) support the conclusion that a cause and effect relationship existed between news and Freddie Mac's stock price.[145] Dr. Hallman claims that his joint significance tests demonstrate that Freddie Mac's abnormal returns, even though individually not significant on four of the six Analyzed Dates, were still somehow significant as a group.[146] However, as I discuss below, Dr. Hallman uses a flawed methodology to conduct these tests that are designed to reach the desired conclusion.

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[143]   Hallman Report, ¶23.

[144]   "Today In Business Freddie Mac Forecasts Losses," *The New York Times*, January 6, 2007. [Cited in Hallman Report, ¶ 22].

[145]   Hallman Dep., 152: 12 - 25.

[146]   Hallman Report, ¶28.

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96.   As an initial matter, Dr. Hallman does not cite in his report any authority that supports conducting joint significance tests on unrelated events in a market efficiency event study. At deposition, he was unable to identify any authority that supports such an approach.[147]

97.   Dr. Hallman also acknowledges that he had never run joint significance tests before, and was apparently unaware of them until a colleague ["who "knows a lot more econometrics"[148]] suggested joint significance tests[149] given that Dr. Hallman's event study had found Freddie Mac's abnormal returns to be statistically insignificant on 4 of the Analyzed Dates on an individual basis. Thus, in Dr. Hallman's opinion joint significance tests are a way to "**see if there is anything here**"[150] *i.e.,* a means to detect statistical significance in a group of dates if one initially finds that the stock's abnormal return was not statistically significant on individual dates.

98.   I have confirmed that by cherry-picking the dates he has included in his joint significance tests, Dr. Hallman has designed his tests to reach his desired conclusion.

99.   According to Dr. Hallman's event study, Freddie Mac's abnormal returns were not statistically significant on an individual basis on the first four of the six Analyzed Dates (October 3, 2006, January 5, 2007, March 23, 2007 and June 14, 2007).[151] Yet, Dr. Hallman fails to conduct a joint significance test for this group of dates. In his deposition, Dr. Hallman testified that he cannot think of a single test of joint significance that could show that the first four events on table one were allegedly jointly statistically significant:[152]

> Q. If you were testing solely to determine if a semi strong efficient market existed between the first day of the class period which is August 1, 2006, and August 29, 2007, what joint significant test

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[147]   Hallman Dep., 241: 19 - 25; 245: 11 - 246: 9.

[148]   Hallman Dep., 231: 18.

[149]   Hallman Dep., 230: 6 - 231: 22.

[150]   Hallman Dep., 232: 24.

[151]   Hallman Report, Table 1.

[152]   Hallman Dep., 248: 21 – 249: 15.

could you have run in order to try to show that the first four events on table one were allegedly jointly statistically significant?

A. I don't know.

Q. Is there any test you can think of that you can possibly run that would show that those first four statistically insignificant dates jointly, under some test ---

A. Shhh.

Q. -- will come out at as statistically significant combined?

A. I just said --you just asked me that, and I just said I don't know. I can't.

100.   I have confirmed using Dr. Hallman's own joint significance (F- and Chi-squared) tests that Freddie Mac's abnormal returns are <u>never</u> jointly significant across the first four Analyzed Dates or any subset of them (*i.e.*, any two or any three of these four days). I report these results in Appendix 6, Panel A.[153]

101.   In addition, I have confirmed using Dr. Hallman's joint significance (F- and Chi-squared) tests that his joint significance conclusion critically hinges on his inclusion of August 30, 2007 (a date when Freddie Mac's abnormal return was statistically significant and negative) in his sample of dates. I found that if August 30, 2007 is added to (i) the group of the first four Analyzed Dates or (ii) any sub-group of the first four Analyzed Dates, Freddie Mac's abnormal returns are jointly significant in each and every one of these groups.

102.   The following empirical analysis also confirms that Dr. Hallman's joint test result hinges critically on his inclusion of August 30, 2007. There are 272 trading days from the start of the Proposed Class Period through August 29, 2007. Combining any three days from this sample yields a total of 3.32 million unique three-day combinations. I ran F-tests for each of these 3.32 million combinations and found Freddie Mac's abnormal returns on only 3% of them (100,838 combinations) to be jointly statistically significant. However,

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[153]   I have used Dr. Hallman's F-test and Chi-squared test as implemented in exhibit 21 and 22 of his deposition transcript. [Hallman Dep., 207:19 - 208: 17] I report these results in Appendix 6, Panel A.

when I added August 30, 2007 to these 3.32 million combinations and re-ran the F-tests, I found that found Freddie Mac's abnormal returns were jointly significant in 100% of these combinations.

103. Freddie Mac's abnormal returns on October 3, 2006, January 5, 2007, June 14, 2007 and August 30, 2007 are jointly statistically significant simply because August 30, 2007 is included in Dr. Hallman's joint statistical significance tests. Even if one were to assume that Freddie Mac's abnormal returns (and corresponding t-statistics) on October 3, 2006, January 5, 2007, and June 14, 2007 were zero (*i.e.*, by construction, there was no cause and effect relationship on these dates), the test's conclusion would remain unaffected [See Appendix 6, Panel C]. That is, even if a cause and effect relationship on the first three dates is assumed to be non-existent, Freddie Mac's abnormal returns remain jointly statistically significant across these dates if August 30, 2007 is included in the test. Thus, Dr. Hallman's joint statistical significance tests do not establish that Freddie Mac stock traded in an efficient market.

104. Also, even though March 23, 2007 was one of the six dates, which Dr. Hallman selected to analyze the cause and effect relationship, he ignores this date in his joint significance tests. Freddie Mac's abnormal return on March 23, 2007 was not only statistically insignificant, but also had the highest *p*-value.

105. In short, by always excluding the date when Freddie Mac's abnormal return was statistically insignificant with the highest *p*-value (March 23, 2007) and always including August 30, 2007 and/or November 20, 2007 (both dates when Freddie Mac's abnormal return was statistically significant with the lowest *p*-values) Dr. Hallman has ensured that his joint testing will yield significant results.[154]

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[154] Dr. Hallman claimed in his report that the results of his initial F-test (which considered the following five dates: October 3, 2006, January 5, June 14, August 30 and November 20, 2007) would remain unaffected had he excluded the "large negative return on the final event date, 11/20/07." [Hallman Report, ¶28]. Thus, Dr. Hallman tacitly acknowledges that including Freddie Mac's exceptionally large negative abnormal return on November 20, 2007, skews his joint test significance results.

… continued

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106.   Dr. Hallman's joint significance tests are also flawed because they include dates on which Freddie Mac's abnormal returns were in opposite directions, purportedly reacting to different types of news according to Dr. Hallman's own subjective assessment of such news.[155] It is illogical to include in the same joint testing group the abnormal return of a date when the expected price impact is positive with the abnormal return from another date when the expected price impact is negative. That is because one cannot determine *ex ante* the expected direction of the total price impact across all events being analyzed. Thus, as a matter of economic logic, results of joint significance tests based on a "mixed" group, such as the one Dr. Hallman uses, cannot prove that Freddie Mac's stock price reacted significantly and in the logical direction. At deposition, Dr. Hallman was unable to cite any authority to support combining in one joint significance test abnormal returns that are both positive and negative.[156]

107.   To avoid combining positive and negative abnormal return dates in the same test, I tested whether the <u>sum</u> of Freddie Mac's abnormal returns was jointly significant (i) for 10/3/06 and 3/23/07, when the expected price impacts were positive or inline according to Dr. Hallman,[157] and (ii) for 1/5/07 and 6/14/07 when the expected price impacts were negative, according to Dr. Hallman.[158] My F-test results confirm that the <u>sum</u> of the abnormal returns was not statistically significant for either group.[159]

108.   Dr. Hallman's joint significance tests are flawed for yet another reason, as they test un-related events that are separated by many months. Dr. Hallman testified in his deposition that the information released on the various quarterly earnings announcement dates were

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Nevertheless, my review of Dr. Hallman's joint test analyses [Hallman Dep., Exhibit 21] indicates that his reported results are based on F-tests of various subgroups of Analyzed Dates that always include Freddie Mac's statistically significant negative abnormal returns on both November 20 and August 30, 2007.

[155]   Hallman Dep., 143: 22 – 144: 18.

[156]   Hallman Dep., 217: 24 – 218: 4.

[157]   I include 3/23/2007 in the group of days when news that Dr. Hallman identifies is expected to have a positive impact on Freddie Mac's stock price because Freddie Mac's abnormal return was positive that day.

[158]   Hallman Report, Table 1.

[159]   Appendix 6, Panel D.

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"not related,"[160] as they pertained to the Company's financial performance over different quarters. However, he nevertheless chose to combine such dates to tests for a cause and effect relationship between news and the Freddie Mac's stock price. It makes no economic sense to test the joint significance of unrelated events that are over a year apart (when November 20, 2007 is included in the joint significance test). At deposition, Dr. Hallman was unable to cite any authority that "permits you to combine unrelated events from totally different periods into one combined F test or Chi-squared test in examining market efficiency."[161] Nevertheless, taken at face value, Dr. Hallman's joint significance test result means that "positive" news released as early as October 3, 2006 was not fully incorporated until either August 30, 2007 (a 10 month window) or November 20, 2007 (a window of more than a year), and the ultimate combined reaction was negative. Such a delayed reaction in the opposite direction does not support the finding that Freddie Mac's stock traded in an efficient market as Dr. Hallman asserts.

109. In sum, the empirical evidence – based on the statistical significance of Freddie Mac's abnormal returns whether considered in isolation or jointly – does not support Dr. Hallman's claim that Freddie Mac's stock traded in a semi-strong form efficient market.

Flaw 6: Dr. Hallman fails to control for the impact of industry effects and heightened volatility during the credit crisis, which renders invalid his conclusion that Freddie Mac's abnormal return on August 30, 2007 was statistically significant.

110. Properly constructed event studies should control for: (a) market effects; (b) industry effects; and (c) changing volatility. Dr. Hallman's event study controls only for market effects. Therefore, it yields results that are improperly skewed in favor of finding statistically significant abnormal returns.

111. In conducting an event study to analyze stock price changes in response to identified events, economists use models that control for the effects of events that are market-wide (such as changes in economic growth rates) as well as events that are relevant to that

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[160] Hallman Dep., 236: 16 – 240: 10.

[161] Hallman Dep., 240: 17 - 25.

firm's particular industry (such as changes in laws or regulations pertinent to the industry). Even the studies that Dr. Hallman cites recognize this fact.[162]

112.   Indeed, in the Hallman ArthroCare Report, Dr. Hallman's event study controlled for industry impact, unlike his study here.[163]

113.   Economists also use models that control for changing volatility of the stock's returns in particular periods.[164] The statistical significance of the abnormal return is determined using a yardstick called the "standard error."[165] In selecting that yardstick in an event study, one must account for general market volatility. Under normal circumstances, when the market volatility remains more or less constant, it is appropriate to use the standard regression model with no adjustment for changing volatility. But a sudden change in the volatility, however, can affect the standard error in a meaningful way. A simple example may illustrate this point better. If most of the waves in a placid lake are less than one foot in height, then a two-foot wave may be considered huge, relative to the one-foot waves. However, in a stormy ocean where most waves are 4 feet or higher, the use of the same yardstick of one-foot will lead to the mistaken conclusion that almost all waves are abnormally large, when they are not. One needs to adopt a different yardstick in such a case. Similarly, to properly isolate the impact of unexpected corporate news on a stock price when the volatility in the market has suddenly increased, one must adjust the yardstick – replace the placid-lake yardstick with the stormy-ocean yardstick– to account for that heightened market-wide volatility.

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[162] Tabak and Dunbar (2001), page 19-5.

[163] Hallman ArthroCare Report (Appendix 3). Hallman Dep., 286: 14 - 22; 287: 9 - 12.

[164] Greene, William H. (2011), *Econometric Analysis*, 7th edition, NJ: Prentice Hall, Chapter 9, page 22, and 279. Also see: [1] Below, Scott D. and Keith H. Johnson (1996), "An Analysis Of Shareholder Reaction To Dividend Announcements In Bull And Bear Markets," *Journal of Financial And Strategic Decisions*, vol. 9(3), pages 15 -26; [2] Bommel, J. van, and T. Vermaelen (2003), "Post-IPO capital expenditures and market feedback," *Journal of Banking & Finance*, vol. 27, pages 275–305; [3] Henry, Peter Blair (2002), "Is Disinflation Good for the Stock Market?," *The Journal of Finance*, vol. 57(4), pages 1617-1648; [4] Arslanalp, Serkan and Peter Blair Henry (2005), "Is Debt Relief Efficient?," *The Journal of Finance*, vol. 60(2), pages 1017-1051.

[165] Mitchell and Netter (1994), page 569.

114.   While it is true that Dr. Hallman's model controls for the impact of market effects by predicting returns based on the S&P 500 Index,[166] his model is deficient in other respects.

115.   Dr. Hallman's model fails to control for the impact of industry-wide events or the heightened market-wide volatility during the later part of the Proposed Class Period. As I discuss in detail in Appendix 7, during the August – November 2007 period, several industry (or Government Sponsored Enterprises ("GSE")-specific) developments occurred, which Dr. Hallman's model fails to address.

116.   Dr. Hallman has also admitted that the control period on which his market model was based does not include the global credit crisis and does not control for the increase in market volatility during the Proposed Class Period as a result of the crisis.[167]

117.   As discussed above, Dr. Hallman's event study yields statistically significant results for only two of the six Analyzed Dates. Even his event study results for those two statistically significant dates, however, are unreliable, as they occurred during the global credit crisis, which Dr. Hallman ignores. As I explain below (in ¶139), when one controls for industry effects and volatility, Freddie Mac's abnormal return for August 30, 2007 is not statistically significant using the two-tailed test and conventional 5% significance level. Thus, even according to Dr. Hallman's model corrected for certain flaws, Freddie Mac's stock reacted to news on only one day in the entire 330-day Class Period.

118.   On Thursday, August 9, 2007, the global credit markets became ensnared in the throes of a severe and unforeseen credit crisis. Early that morning, the investment banking unit of France's largest bank, BNP Paribas, announced that it had frozen redemptions for three investment funds with over 2 billion Euros in assets, and that "[t]he complete evaporation of liquidity in certain market segments of the US securitization market has made it

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[166]   I replicated Dr. Hallman's model as described in Hallman Report, ¶19. Per my replication, Freddie Mac's abnormal return for a day equals the percentage change in Freddie Mac's stock price (Freddie Mac's "arithmetic return" or "return") less Freddie Mac's predicted return based on the percentage change in S&P 500 Index (the "Index return") that day. To calculate Freddie Mac's predicted return, Dr. Hallman estimates the historical relationship between Freddie Mac's return and the Index return over the period from August 1, 2005 to July 31, 2006, one year prior to the start of the Proposed Class Period. [Hallman Report, ¶19].

[167]   Hallman Dep., 273: 19 - 25.

impossible to value certain assets fairly regardless of their quality or credit rating."[168] BNP Paribas' comments ignited "fears of a credit crunch."[169] A few days later, Northern Rock, the British lender, was rescued from collapse by the Bank of England. Looking back, Adam Applegarth, then chief executive of Northern Rock, said that August 9, 2007 "is the day the world changed."[170]

119.   As Chairman Bernanke noted, at that time "[c]oncerns about liquidity and credit risk surfaced even in markets in which securitization plays a much smaller role."[171] This contagion led to the sudden increase in various risk-related spreads between key interest rates. For instance, as shown in Figure 1, the TED spread (which measures the difference between the risky LIBOR rate and the risk-free U.S. Treasury bill rate) widened dramatically, increasing from 55 basis points (bps)[172] on August 8, 2007 to 242.5 bps, on August 20, 2007, a change of 340%.[173] As Brunnermeier (2009) notes, the "TED spread widens in times of crises."[174]

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[168]   BNP Paribas Press Release, "BNP Paribas Investment Partners temporarily suspends the calculation of the Net Asset Value of the following funds: Parvest Dynamic ABS, BNP Paribas ABS EURIBOR and BNP Paribas ABS EONIA," August 9, 2007.

[169]   Cooper, Amanda, "Europe shares fall as BNP Paribas spooks investors," *Reuters News*, August 9, 2007.

[170]   Cane, Jeffrey, "The Great Panic," *Portfolio.com*, August 8, 2008.

[171]   Bernanke, Ben, "The Recent Financial Turmoil and its Economic and Policy Consequences," At the Economic Club of New York, New York, October 15, 2007.

[172]   One percent equals 100 basis points.

[173]   Source for LIBOR rate and the risk-free U.S. Treasury bill rate – Bloomberg.

[174]   Brunnermeier, Markus K. (2009), "Deciphering the Liquidity and Credit Crunch 2007-08," *Journal of Economic Perspectives*, 23(1), pages 77-100, page 85.

Figure 1: Market Signals of a Liquidity Crunch and Growing Credit Risk
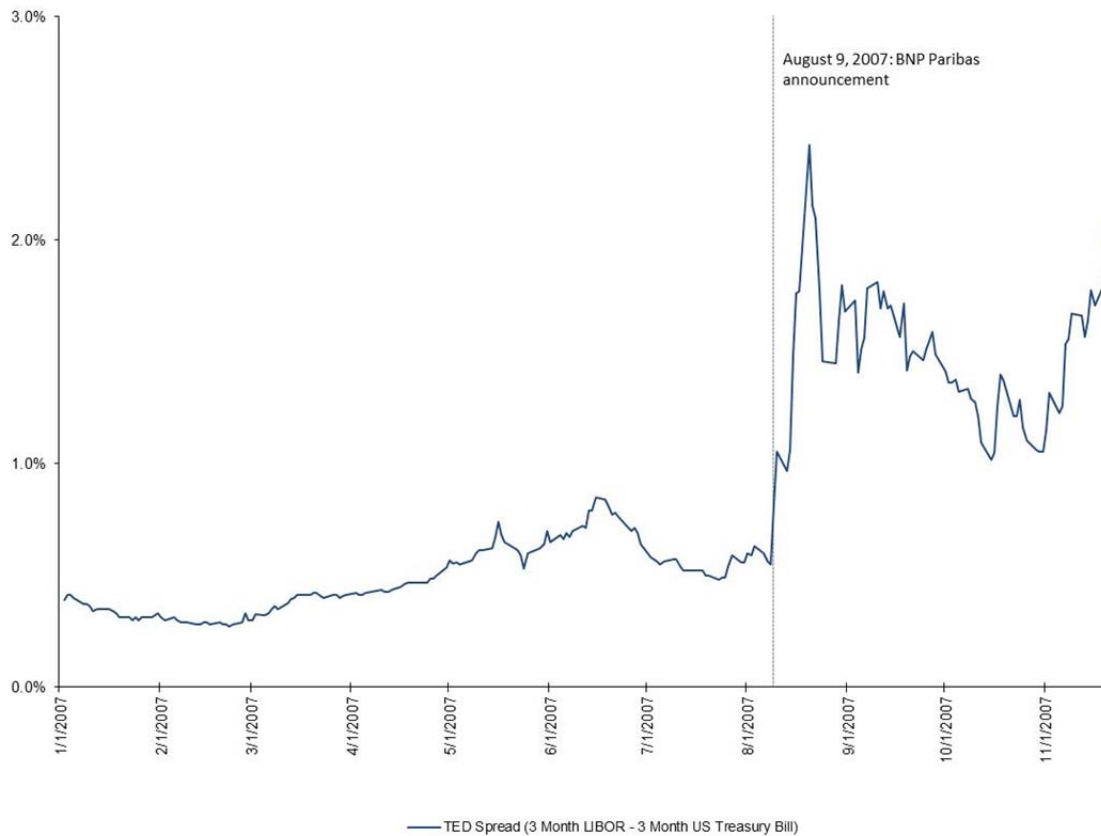
Source: Bloomberg

120.   On August 24, 2007, the Fed attempted to inject further liquidity into the market by expanding the scope of the collateral it accepted for such loans to include "investment quality asset-backed commercial paper."[175]

121.   In September of 2007, the credit crisis escalated and both U.S. and international institutions took steps to alleviate the impact of the financial crisis. On September 6, 2007, *Reuters News* reported that Federal Reserve and the European Central Bank "injected liquidity into the banking systems" to "calm rising short-term rates amid lingering fears that the subprime housing crisis has morphed into a global credit

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[175]   Torres, Craig and Mark Pittman, "New York Fed Accepts Asset-Backed Paper as Collateral (Update3)," *Bloomberg*, August 24, 2007.

crunch."[176] On September 14, Northern Rock, one of England's largest retail mortgage lenders agreed with the Bank of England to "raise liquidity as needed through either secured borrowings or repurchase facilities with the U.K central bank" to "fund its operations during the current period of turbulence in financial markets."[177]

122. As I discuss in Appendix 7, the impact of the credit crisis on GSEs was exacerbated by the concurrently worsening outlook of the U.S. housing markets. On September 18, 2007, the Federal Reserve reduced its federal funds rate target (from 5.25 percent to 4.75 percent) "for the first time in four years … to prevent a steep housing slump and turbulent financial markets from triggering a recession."[178]

123. As Figure 1 shows, the Federal Reserve's intervention temporarily improved liquidity in the credit market in October 2007.   On October 15, 2007, Federal Reserve Chairman Ben Bernanke noted that "[c]onditions in financial markets have shown some improvement since the worst of the storm in mid-August, but a full recovery of market functioning is likely to take time, and we may well see some setbacks."[179] Chairman Bernanke also noted that a "deepening housing slump probably will be a 'significant drag' on economic growth into next year and it will take time for Wall Street to fully recover from a painful credit crisis."[180] On October 22, 2007, the head of the International Monetary Fund expressed concerns about the ongoing credit crisis and noted that the "global economy faces a period of uncertainty, with risks to continued growth much higher than they were six months ago. … [F]urther disruption in financial markets and further falls in housing

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[176] Aubin, Dena, "CREDIT WRAPUP 7-Fed, ECB inject liquidity as foreclosures rise," *Reuters News*, September 6, 2007.

[177] Teitelbaum, Henry, "5th UPDATE: Northern Rock Borrows From BoE; Shares Off 26%," *Dow Jones Capital Markets Report,* September 14, 2007.

[178] Crutsinger, Martin, "Fed cuts key interest rate in effort to fend off recession," *Associated Press Newswires*, September 18, 2007, 15:49.

[179] Aversa, Jeannine, "Bernanke: Housing Woes to Slow Growth," *Associated Press Newswires*, October 15, 2007, 19:56.

[180] Aversa, Jeannine, "Bernanke: Housing Woes to Slow Growth," *Associated Press Newswires*, October 15, 2007, 19:56.

prices could lead to a global economic downturn, making other risks -- rising food and oil prices, a falling dollar -- loom larger."[181]

124.   On October 31, 2007, the Federal Reserve again took action to combat "the strains of a deepening housing slump" and lowered the federal funds rate a quarter of a percentage point.[182] Nevertheless, the credit crisis continued to worsen. On November 5, 2007, Citigroup announced that it would have to "write off between $8 billion and $11 billion more to reflect the declining value of subprime-mortgage-related securities."[183] On November 13, 2007, Bank of America warned that they were "currently estimating a $3 billion pre-tax charge to be taken in the fourth quarter to mark down collateralized debt obligations."[184] As Figure 1 shows, the TED spread, which had declined in October 2007, started to increase again in November 2007 and the GSEs' cost of debt financing for their operations increased.[185]   On November 19, 2007, the cost of raising debt for the two GSEs relative to treasury bonds rose to its highest level in a decade, only to be exceeded again the very next day, *i.e.*, on November 20, 2007, the last day of the Proposed Class Period.[186]

125.   Market turmoil continued into 2008 and, on July 15, 2008, the U.S. Securities and Exchange Commission ("SEC") publicly announced that "the normal price discovery

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[181]   Dunphy, Harry, "IMF chief says outlook for global economy uncertain after recent market turbulence," *Associated Press Newswires*, October 22, 2007, 15:14.

[182]   Aversa, Jeannine, "Federal Reserve cuts interest rate to help ease strain of housing slump on US economy," *Associated Press Newswire,* October 31, 2007, 21:12.

[183]   "AT A GLANCE: Prince Exits Citi Amid $8B-$11B In New Writedown," *Dow Jones International News*, November 5, 2007.

[184]   Spence, John, "2ND UPDATE: Bank Of America Warns Of Additional CDO Losses," *Dow Jones Business Week*, November 13, 2007.

[185]   "Investor nervousness over mortgages has raised the cost of borrowing for Fannie and Freddie Mac, said Jim Vogel, an analyst at FTN Financial Capital Markets, Memphis, Tenn. Friday, their five-year debt was quoted at a yield about 0.65 percentage point above the equivalent U.S. Treasury issue, up from 0.40 percentage point three months ago, Mr. Vogel said." [Hagerty, James R., "Defaults Take a Toll on Fannie Mae," *The Wall Street Journal*, November 10, 2007].

[186]   "Yield premiums on some U.S. agency debentures have gapped out to or near their widest in a decade, reflecting interest rate swaps and sharply lower Treasury yields in markets steeped in credit fears. … Two-year swap spreads are at their widest since 1989." [Haviv, Julie, "MORTGAGES/AGENCIES-Spreads hit new wides; Freddie in focus," *Reuters* News, November 19, 2007]; Also see Haviv, Julie, "UPDATE 2-MORTGAGES/AGENCIES-Agency 2-yr sector at 10-yr wide," *Reuters News*, November 20, 2007.

process," which is the hallmark of an efficient market, had not been functioning properly for Freddie Mac's stock and that of several other major financial companies,[187] and it banned "naked" short selling of Freddie Mac's stock and that of 18 other financial companies. Again, on September 19, 2008, the SEC, acting in concert with the U.K. Financial Services Authority, "took temporary emergency action to prohibit short selling in [799] financial companies to protect the integrity and quality of the securities market and strengthen investor confidence" as such unprecedented market turmoil continued.[188]

126.   In view of the global credit crisis, which began on August 9, 2007 and resulted in both market-wide and Freddie Mac stock price volatility (see Figure 2 Panel A), it does not surprise me that Dr. Hallman's market model generates an unusually high level (34.2%) of abnormal returns from August 9, 2007 through the end of the Proposed Class Period, as I discuss below. This is because he makes no effort to control for such heightened volatility in any of his statistical procedures. In fact, Dr. Hallman makes no mention of the global credit crisis in his report.

127.   Dr. Hallman's event study yields statistically significant abnormal returns for only two dates, both of which occurred during the global credit crisis that began on August 9, 2007: August 30, 2007 and November 20, 2007. As Dr. Hallman's market model is predisposed to identify statistically significant abnormal returns from August 9, 2007 through November 20, 2007 (*i.e.*, 34.2% of all dates during that period yield abnormal returns per his model), that model is unreliable as a tool to measure the impact of news on Freddie Mac's stock price. Accordingly, Dr. Hallman's conclusions regarding the abnormal returns on August 30, 2007 and November 20, 2007 are unreliable.

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[187]   Securities and Exchange Commission, "Emergency Order Pursuant To Section 12(K)(2) Of The Securities Exchange Act Of 1934 Taking Temporary Action To Respond To Market Developments," Securities Exchange Act Of 1934 Release No. 58166, July 15, 2008; henceforth "SEC July 15 2008 Order."

[188]   Securities and Exchange Commission, "SEC Halts Short Selling of Financial Stocks to Protect Investors and Markets," September 19, 2008.

Flaw 7: Dr. Hallman's reliance on his model's "good overall fit" during the Proposed Class Period lacks basis in the field of economics and makes no sense given the actual "fit" of his model.

128. As explained above, to conduct his event study, Dr. Hallman created a statistical market model over an estimation period. According to Dr. Hallman, his statistical model exhibited "good overall fit measures with a statistically significant F-statistic" over his estimation period, which "supports a finding that the market for Freddie Mac common stock was (semi-strong form) efficient."[189] Similarly, he asserts that "[a] model estimated over the class period is similarly statistically significant, supporting the finding that the market for Freddie Mac common stock efficiently processed news into returns and was (semi-strong form) efficient during the class period."[190]

129. Dr. Hallman does not identify any benchmarks that would allow another researcher to distinguish a model that has a "good fit" and one that has a "bad fit." So far as I am aware, there is no such benchmark. An undergraduate text book on econometrics notes:[191]

> Goodness of fit is relative to the topic being studied. … [T]here is no simple method of determining how high R2 [a common measure of goodness of fit] must be for the fit to be considered satisfactory

130. Further, Dr. Hallman fails to identify any academic literature to support his claim that the supposed "fit" of his model supports a finding of market efficiency. At deposition, Dr. Hallman testified that he was not aware of any source of authority to support a conclusion that the market for a stock was efficient based on the "fit" of a market model.[192] The academic literature does not support his claim and provides no benchmarks to assess market efficiency based on the goodness of fit of the event study model.

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[189] Hallman Report, ¶19.

[190] Hallman Report, ¶19.

[191] A.H. Studenmund, "Using Econometrics A Practical Guide", Fourth Edition, Addison-Wesley Longman, page 49.

[192] Hallman Dep., 267: 13 - 22.

131. Dr. Hallman does not use the Proposed Class Period as estimation period of the market model that he uses to conduct his event study. Instead, his market model's estimation period spans one year prior to the start of the Proposed Class Period (the "control period"). Again without providing any results, Dr. Hallman claims that this estimated statistical model has a "good overall fit" over the control period and therefore "supports a finding that the market for Freddie Mac common stock was (semi-strong form) efficient … during the control period."[193] This claim too is without any basis in academic literature. It is also irrelevant, as a matter of logic, to an assessment of the efficiency of the market for Freddie Mac's common stock during the Proposed Class Period.

132. Contrary to Dr. Hallman's claim of good overall fit, my empirical analysis demonstrates that his model does not fit the data over the Proposed Class Period. As Figure 2 Panel A below demonstrates, volatility in the over-all equity market, measured by the VIX volatility index,[194] rose dramatically in August 2007. Freddie Mac's implied volatility[195] also rose in August 2007. The VIX average over Dr. Hallman's control period was 13.24%, and it was 13.14% over the Class Period through August 8, 2007. Thereafter, the VIX average rose significantly. It was 72% higher from August 9, 2007 through the end of the Proposed Class Period than it was during Dr. Hallman's control period.

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[193] Hallman Report, ¶19.

[194] VIX is the ticker symbol for the Chicago Board Options Exchange Volatility Index. The index is a "30-day measure of the expected volatility of the S&P 500 Index" and is a "key measure of market expectations of near-term volatility." [www.cboe.com/micro/VIX/vixintro.aspx, accessed 10/31/12.]

[195] Implied volatility is the future volatility estimate for Freddie Mac stock. The implied volatility that I report for Freddie Mac stock is computed by OptionMetrics, a well-known provider of such data, through prices of 30-day call options traded on the Company's stock.

Figure 2 Panel A: Market-Wide Volatility and Freddie Mac Implied Volatility Rose Dramatically Following the Sudden Eruption of the Global Financial Crisis in August 2007[196]
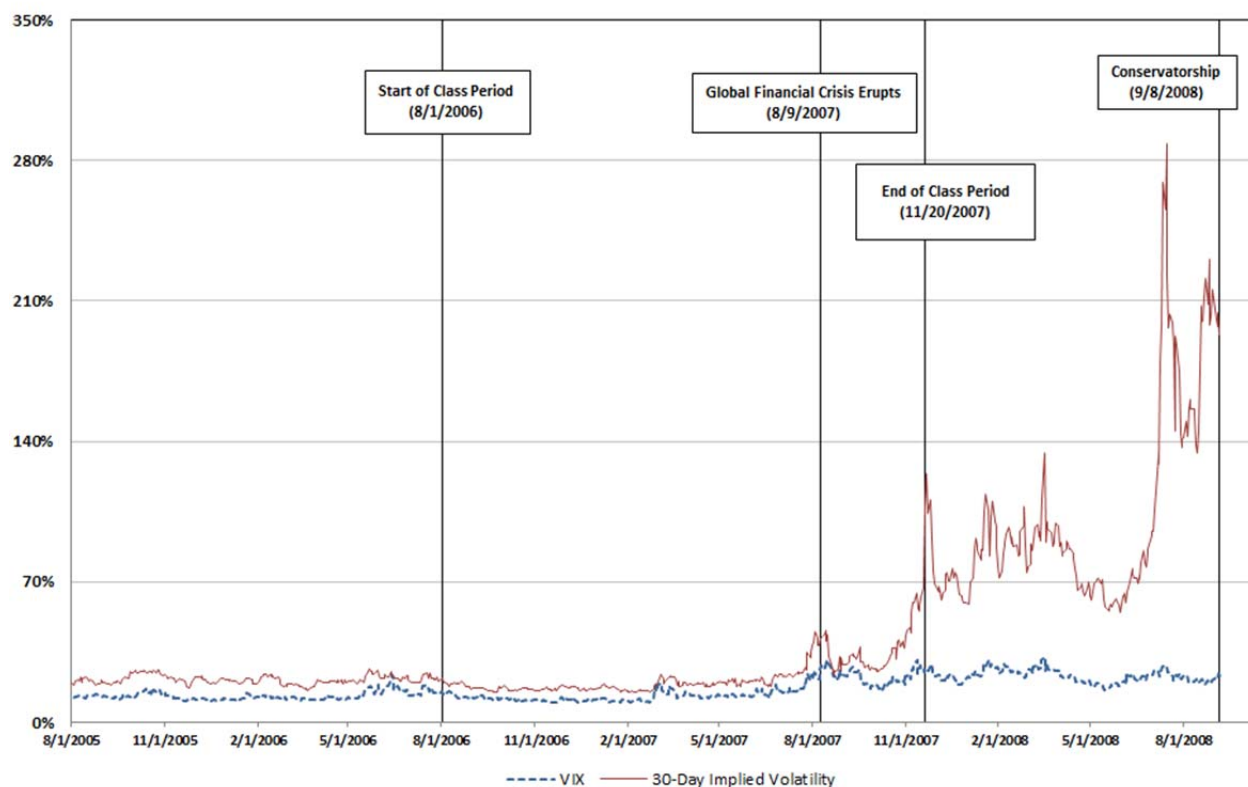

133.   Figure 2 Panel B demonstrates that, starting in August 2007, the difference between the actual and predicted Freddie Mac stock returns (*i.e.*, the abnormal daily return) widened considerably. This pattern of deviation demonstrates that Dr. Hallman's model performs poorly starting in August 2007, suggesting that it does not effectively factor out the effect of substantially increased volatility that began in August 2007. Dr. Hallman, however, still compares the abnormal return during this period to the volatility of Freddie Mac's abnormal returns over his control period (*i.e.*, August 1, 2005 to July 31, 2006) to identify statistically significant dates. Consequently, Dr. Hallman's model, when applied to Freddie Mac's stock price on every single day of the Proposed Class Period from August

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[196]   Source: VIX Data is from Bloomberg. Implied Volatility for Freddie Mac stock is from OptionMetrics.

9, 2007 through November 20, 2007 ("Crisis Period"), results in abnormal returns that are statistically significant on <u>34.2%</u> of the days remaining in the Proposed Class Period after August 8, 2007 (which is 73 trading days). In contrast, the same model identifies only 3.5% of the days in the first part of the Proposed Class Period through August 8, 2007 (which is 257 trading days) to be statistically significant. Such a divergence in the frequency of significant dates is clear evidence of a poor fit of Dr. Hallman's model resulting from substantial difference in market-wide volatility between the two intervals.

Figure 2 Panel B: Dr. Hallman's Market Model Identified Disproportionately Large Number of Statistically Significant Abnormal Returns during the Volatile Part of the Class Period[197]
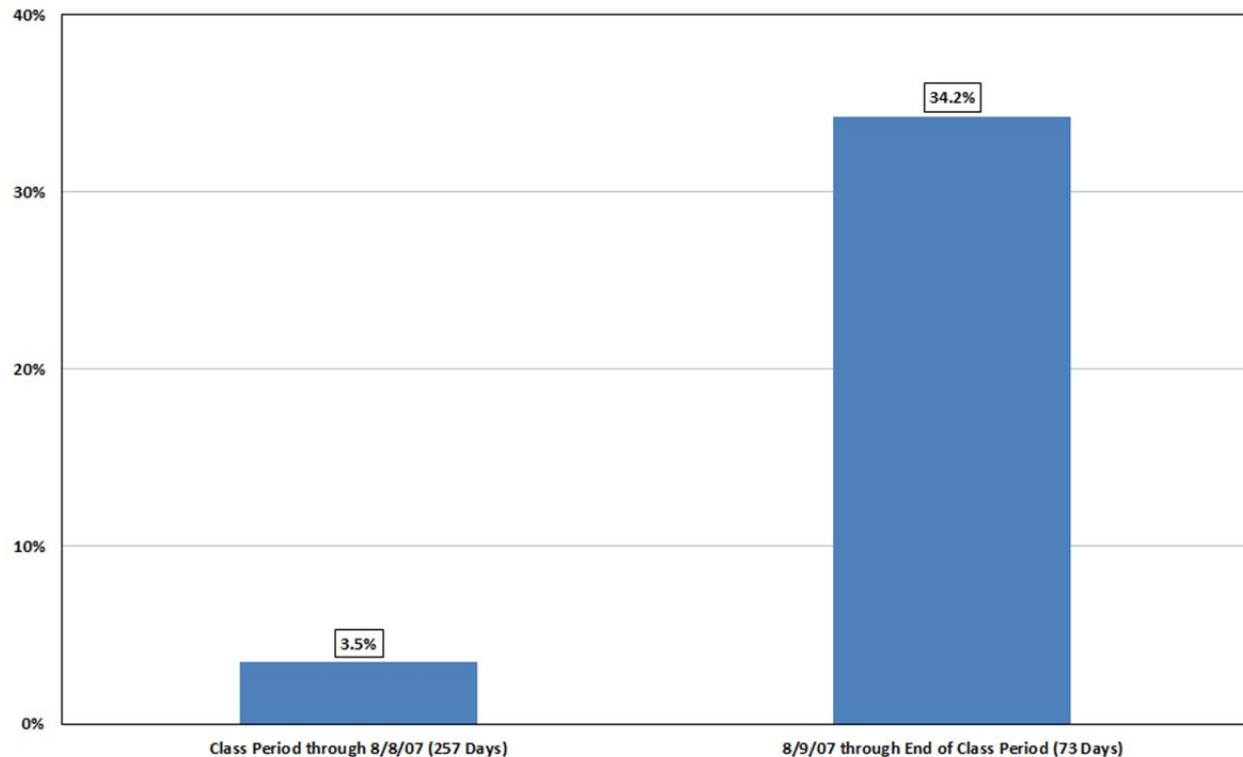
134.   As I have noted earlier, an event study requires the computation of a stock's abnormal return following an event. Such an abnormal return is defined as the stock's actual return

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[197]   Source: Abnormal Return data is from my replication of Hallman's event study model.

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less its predicted return, which is based on the stock's estimated relationship to a market index (and usually also an industry index). In conducting his event study, Dr. Hallman calculated Freddie Mac's predicted return on each of the Analyzed Dates based on the stock's estimated relationship to the market (S&P 500) index (or market beta) derived by running a regression model over the August 1, 2005 - July 31, 2006 period.[198]

135. In other words, Dr. Hallman assumes in conducting his event study that Freddie Mac's market beta over the Proposed Class Period remains unchanged from its value of 0.75 estimated over the August 1, 2005 - July 31, 2006 period.[199] Such an assumption is speculative and incorrect. Dr. Hallman's regression model runs over periods with market betas far higher than 0.75:

   a. August 1, 2006 (the first day of the Proposed Class Period) through August 8, 2007 (the day before the credit crisis erupted) yields a market beta of 1.16, which is nearly 60% higher than the beta of 0.75 that Dr. Hallman has used in his event study.

   b. August 9, 2007 through November 20, 2007 yields an even higher beta of 1.72, which is more than double the beta of 0.75 that Dr. Hallman has used in his event study.

Thus my empirical analysis confirms that the relationship between Freddie Mac stock's return and the market index changed significantly over the latter part (after August 8, 2007) of the Proposed Class Period.

136. Further, Dr. Hallman does not take into consideration the heightened market-wide volatility and changes in industry conditions during the latter part (after August 8, 2007) of the Proposed Class Period that were particularly relevant to the GSEs. The identification of too many dates with statistically significant abnormal returns in this later period arises from these two fundamental errors.

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[198] Hallman Report, ¶19.

[199] "Summary Output-FMCC Market Model" in Hallman Dep., exhibit 23 "Statistical output from pre-period market-model."

137. Failure to consider industry-wide events and the impact of heightened market-wide volatility renders Dr. Hallman's event study model unreliable during the period starting August 9, 2007. Notably, Dr. Hallman's event study analyzes events on four dates prior to August 9, 2007 and still finds that Freddie Mac's stock did not show a cause and effect relationship on any of the four Analyzed Dates in that period. More specifically, all four dates in Dr. Hallman's study that preceded August 9, 2007 (*i.e.*, October 3, 2006, January 5, 2007, March 23, 2007 and June 14, 2007) yielded statistically insignificant results.[200]

138. By contrast, Dr. Hallman finds the abnormal returns of the two Analyzed Dates in the period from August 9, 2007 through the end of the Proposed Class Period (*i.e.*, August 30, 2007 and November 20, 2007) to be statistically significant. That is hardly surprising, given that his model finds that there supposedly were statistically significant abnormal returns on 34.2% of the dates during this period.

139. I re-ran Dr. Hallman's market model over the credit crisis period (August 9, 2007 through November 20, 2007), adding (i) Fannie Mae's return as an explanatory variable as Dr. Hallman acknowledges in his deposition that this GSE was the only appropriate industry peer for Freddie Mac;[201] and (ii) two indicator variables[202] for August 30, 2007 and November 20, 2007 (the two Analyzed Dates Dr. Hallman selects during the credit crisis period). The results of this regression confirm that Freddie Mac's abnormal return on August 30, 2007 is not statistically significant using the two-tailed test and the conventional 5% significance cut off adjusting for the heightened volatility and industry effects. [See Appendix 8].

140. This analysis shows that Dr. Hallman's claim that Freddie Mac's stock price displayed a cause-and-effect relationship throughout the Class Period depends only on the price reaction on November 20, 2007, the last day of the Class Period being statistically significant. A showing that there was a negative and significant price reaction on the last

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[200] Hallman Report, Table 1.

[201] Hallman Dep., 287: 24 - 288:2.

[202] Dr. Hallman has also used dummy (or indicator) variables in regressions he has conducted in this case. [Hallman Dep., 200: 14-18.]

day of a span of 330 days is of no probative value. Such a reaction does not constitute economic evidence that there was a cause and effect relationship on any other day.

D.   Dr. Hallman's Analysis of the Other *Cammer* and *Krogman* Factors Is Insufficient to Support His Opinion.

141.   Although the other *Cammer* and *Krogman* factors that Dr. Hallman considers can be indicators of market efficiency, they are not, alone, sufficient to establish market efficiency.[203]

142.   As Dr. Hallman acknowledges, the other seven *Cammer* and *Krogman* factors set forth above all refer to "structural" market conditions.[204] These conditions may promote, but do not necessarily result in, a cause and effect relationship between new information and stock price movements.[205] At deposition, Dr. Hallman admitted that, if there is no cause and effect relationship between new material information about a company and a quick reaction in its stock price, then that company's stock is not trading in a semi-strong form efficient market.[206]

143.   Accordingly, Dr. Hallman's effort to check off a list of the factors in *Cammer* and *Krogman* are not sufficient, from an economic perspective, to establish market efficiency. It is the cause and effect relationship between unexpected, material news and stock price reaction that is the essence of market efficiency, and Dr. Hallman's event study fails to establish that relationship. The existence of some of the other factors does not establish that relationship either, according to the academic literature.

144.   For example, Dr. Hallman asserts that "the idea that large stocks traded on the major exchanges (NYSE and NASDAQ) are semi-strong form efficient is taught in MBA finance textbooks used at virtually every major business school in the U.S."[207] This

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[203] *Freddie Mac Kreysar Opinion,* page 11.

[204] Hallman Report, ¶3.

[205] *Freddie Mac Kreysar Opinion,* page 11.

[206] Hallman Dep., 80:2 – 21.

[207] Hallman Report, ¶8.

argument proves too much. Under Hallman's argument, the stock of every large company trading on a major exchange would *per se* be deemed to trade in an efficient market. As Dr. Hallman admitted at deposition, absent a cause and effect relationship between material news and price reaction, the stock is not trading in an efficient market, even if it is traded over the New York Stock Exchange.[208] He also admitted that the mere fact that a stock is listed on a national exchange does not by itself establish that the stock traded in an efficient market.[209]

145. In fact, as numerous empirical studies published in leading academic journals over the past several decades have established, they have not.

146. For instance, Bodie *et al.*, a text that Dr. Hallman cites in support of his opinion, discusses several instances when even large capitalized stocks, that were actively traded and followed by stock analysts, have traded in inefficient markets, for some periods, and then traded in efficient markets in other periods.[210]

147. Consequently, as Bodie *et al.* notes, "the EMH [efficient markets hypothesis] has never been widely accepted on Wall Street,"[211] and a new school of thought dubbed "behavioral finance" has developed in the finance literature. In fact, in 2002, the Nobel Prize was awarded for research in the field of behavioral finance.[212] This field argues that security prices may not satisfy the first implication of the EMH, *i.e.*, may not "properly reflect whatever information is available to investors."[213]

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[208] Hallman Dep., 80: 2 – 21.

[209] Hallman Dep., 83: 2 - 8.

[210] Bodie *et al.*, pages 361-364.

[211] Bodie *et al.*, page 356.

[212] Professor Daniel Kahneman of Princeton University developed what he called "Prospect Theory." His work won him and his colleague, Amos Tversky, the Nobel Prize in Economics in 2002, and is the basis of what is now called Behavioral Finance. Bodie *et al.*, dedicate a chapter (Chapter 12) to a discussion of behavioral finance principles and findings.

[213] Bodie *et al.*, page 381.

148.   Contrary to Dr. Hallman's assumption set forth in his report that stocks trading on major exchanges trade in efficient markets,[214] which is based on an incomplete reading of the relevant academic literature, it is now well-accepted that the trading and pricing of even stocks of large firms on organized exchanges may violate the EMH over extended time periods. This finding is taught at all major MBA schools, including Berkeley, and it is supported by well-accepted economic principles and research in the field of behavioral finance, as Bodie *et al.* also discusses.[215]

149.   As several academic studies have found, even the prices of well-capitalized companies' stocks that traded on major exchanges may not be semi-strong form efficient over extended periods.[216]

150.   Further, there is no benchmark against which to measure a number of the *Cammer* factors, such as the number of analysts or market makers for a company's stock. Academic studies, such as Barber *et al.* (1994) also note:[217]

> The various market efficiency criteria applied so far by courts are ad hoc. We know of no systematic body of evidence showing that these or any other criteria distinguish between efficient and inefficient stocks. Nor are we aware of evidence supporting specific cutoff values of these criteria.

151.   In view of the foregoing, a mechanical review of the *Cammer* and *Krogman* factors, such as Dr. Hallman has done in this case, is inadequate for assessing a stock's market efficiency.

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[214]   Hallman Report, ¶ 8.

[215]   Bodie *et al.* page 361-364.

[216]   Lamont and Thaler (2003a), pages 191-202; Lamont, Owen, and Richard Thaler, (2003), "Can the Market Add and Subtract? Mispricing in Tech Stock Carve-Outs," *Journal of Political Economy* 111; henceforth, "Lamont and Thaler (2003b)," pages 227–268; Fedenia, Mark and Mark Hirschey, (2009), "The Chipotle Paradox," *Journal of Applied Finance*, Issues 1 & 2, pages 1-16. See also Mitchell, Mark, Todd Pulvino, And Erik Stafford, 2002, "Limited Arbitrage in Equity Markets," *The Journal of Finance* 57 (2), pages 551 – 584.

[217]   Barber, Brad M., Paul, A. Griffin, and Baruch Lev (1994), "The Fraud-on-the-Market Theory and the Indicators of Common Stock Efficiency," *Journal of Corporation Law*, pages 285-312; henceforth "Barber *et al.* (1994)" at page 290.

IV.   **THE ECONOMIC EVIDENCE DOES NOT SUPPORT A FINDING THAT THE ALLEGED MISREPRESENTATIONS AND OMISSIONS INFLATED THE PRICE OF FREDDIE MAC'S COMMON STOCK OR THAT THEY WERE MATERIAL.**

152.   The Plaintiff alleges: "As a result of Defendants' false and misleading statements and omissions alleged herein, the market price of Freddie Mac common stock was artificially inflated during the Class Period."[218]

153.   In my opinion, the economic evidence does not support a finding that: (i) the alleged misrepresentations were material and caused Freddie Mac's stock price to become inflated; or (ii) information released on November 20, 2007 constituted a curative disclosure thus demonstrating that any prior misrepresentation or omission was material and caused stock price inflation. In addition, the economic evidence is consistent with my conclusion that the alleged failure to disclose Freddie Mac's internal designations of certain loans as C1, C2 and EA[219] was not material, from an economic perspective.

A.   **The Economic Evidence Does Not Support the Conclusion that Alleged Misrepresentations Were Material And Caused Stock Price Inflation.**

154.   The Plaintiff alleges that Defendants made numerous misrepresentations that artificially inflated Freddie Mac's stock price. According to the TAC, these misrepresentations were made on 27 dates during and prior to the Proposed Class Period[220] and such misrepresentations could potentially impact Freddie Mac stock's price on 28 effective dates.[221] Assuming *arguendo* that Freddie Mac's stock traded in an efficient market, the

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[218]   TAC, ¶282.

[219]   See for example, TAC, ¶¶ 37, 67 and 182.

[220]   Five of these alleged misstatements purportedly occurred prior to the Proposed Class Period. [TAC, ¶¶ 140-143] However, the Plaintiff does not appear to be claiming any damages on the basis of these five alleged misstatements. The Complaint notes: "As set forth in the certification appended to the Plaintiff's Original Complaint and incorporated by reference herein, Plaintiff purchased shares of common stock of Freddie Mac during the Class Period at artificially inflated prices and has been damaged thereby." [TAC, ¶18.]

[221]   Dr. Hallman assessed Freddie Mac stock's response to unexpected news based on the stock's abnormal return over one day. Therefore, I too have examined the statistical significance of Freddie Mac's abnormal return over one day; namely on the day of the alleged misstatement if it occurred during (or before) market trading hours, or on the following day if the alleged misstatement occurred after trading hours. I refer to these dates as the "effective dates." Note that Plaintiff alleges that on August 1, 2006 misstatements were made during as well as after trading hours. Consequently, I have examined Freddie Mac's stock price reaction to such alleged misstatements by analyzing the statistical significance of the stock's abnormal return on August 1 and 2, 2006. In addition, the Plaintiff alleges that misstatements were made on 26 other dates during or prior to the Proposed

… continued

Company's stock price would be expected to react quickly and logically to an alleged misrepresentation if it was material. That is, an economist would expect Freddie Mac's abnormal return to be positive and statistically significant on the effective date following an allegedly inflationary misrepresentation.

155. However, Dr. Hallman testified that he did not express any opinion regarding the materiality of the alleged misrepresentations and omissions in the TAC.[222] Using Dr. Hallman's own event study model,[223] I find that Freddie Mac's abnormal return either was *not* statistically significant or was statistically significant in the negative direction on 27 of the 28 effective dates at issue.[224] A negative price reaction following a purportedly inflationary statement does not support the Plaintiff's claim that alleged statements were material and caused the Company's stock price to become inflated, even assuming *arguendo* that the stock did trade in an efficient market.

Class Period. Therefore, to analyze whether such alleged misstatements on 27 dates were material and caused Freddie Mac's stock price to become inflated, I have examined the statistical significance of Freddie Mac's abnormal return on 28 effective dates. Out of the 27 dates, there were 22 dates within the Proposed Class Period when alleged misstatements were made according to the TAC and I refer to these 22 dates as "Alleged Misstatement Dates." See Appendix 9 for a list of all alleged misstatement dates and corresponding effective dates.

Besides the alleged misstatements that could have impacted Freddie Mac's stock price on these 28 effective dates, TAC also alleges a misstatement that was part of an article published in *Mortgage Risk Magazine* in October 2007, whose effective date cannot be determined because the TAC does not provide the specific date of the alleged misstatement.

[222] Hallman Dep., 364: 14 - 18.

[223] I use Dr. Hallman's own flawed event study model to analyze whether Freddie Mac's abnormal returns following alleged misstatements were statistically significant in the logical (positive) direction because, by doing so, the odds of identifying statistically significant abnormal returns is higher (a finding that would support the Plaintiff's claim) than would be the case if I were to employ other, more scientifically reliable models.

[224] In order to assess the significance of Freddie Mac's abnormal returns on the five effective dates prior to the Proposed Class Period, I used the same market model (*i.e.*, used same market index and same estimation period) that Dr. Hallman used [Hallman Report, ¶19] and include a separate indicator variable to identify each effective date. I found that Freddie Mac's abnormal return was not statistically significant in the expected direction on any of the five effective dates. I found Freddie Mac's abnormal return to be not statistically significant following four of the pre-Class Period alleged misrepresentations, and statistically significant but *negative* following the fifth. A negative price reaction following a statement that allegedly inflated the stock price contradicts that allegation. Even cumulatively, Freddie Mac's abnormal return was negative over these five effective dates. See Appendix 9 for event study results based on Hallman's model for 28 effective dates corresponding to various alleged misstatements.

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156.   April 16, 2007 is the only date on which Freddie Mac's abnormal return following an alleged misstatement was statistically significant and positive according to Dr. Hallman's event study model. However, from an economic perspective, there is no basis to attribute this price reaction to the *Business Week* article[225] that the Plaintiff claims was a result of an alleged misstatement by Defendant Piszel.

157.   The *Business Week* article's conclusions are based on its own independent analysis of previously published data, not Mr. Piszel's remarks. In particular, the article considered two alternative sets of previously-known economic data to assess the extent of Freddie Mac's subprime exposure through its Retained portfolio,[226] namely:

- The Company's own disclosure that $124 billion of the $235 billion "private label loans" in its Retained portfolio (at the time) was backed by subprime mortgages (as identified by the securities' originators); and

- Publicly available data about private-label, mortgage-backed securities (not specifically those retained by Freddie Mac) issued the previous year compiled by *Inside Mortgage Finance* (a public data vendor), according to which 74% of such securities were "not considered regular or prime".

158.   Then, given their independent estimate of the contemporaneous size of Freddie Mac's overall business ($2.2 trillion), the *Business Week* article's authors concluded that, "[s]till, in either calculation, subprime is only a small piece of [Freddie Mac's] overall business."[227]

159.   As the *Business Week* article's conclusion is based on previously known facts, its contents cannot be deemed to constitute material new information from an economic perspective. Thus, assuming *arguendo* that Freddie Mac's stock traded in an efficient

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[225] TAC, ¶165 which cites "How Big Is The Bite On Fannie And Freddie," *Business Week*, April 15, 2007, 8:00pm EDT.

[226] Freddie Mac's Retained Portfolio refers to the mortgage loans and mortgage-related securities that the Company purchased for its own investment. [Freddie Mac 2005 Annual Report, page 4.]

[227] "How Big Is The Bite On Fannie And Freddie," *Business Week*, April 15, 2007.

market as the Plaintiff asserts, there is no basis to attribute the stock's abnormal return on April 16, 2007 to the above article.[228]

160.   In short, according to my review of the economic evidence, there is no basis to accept or assume that the alleged misrepresentations caused Freddie Mac's stock price to become inflated because: (i) Freddie Mac's abnormal return was <u>not statistically</u> significant in an inflationary direction on 27 of the 28 effective dates at issue, and (ii) on the only date (April 16, 2007) on which Freddie Mac's abnormal return was statistically significant and positive, that abnormal return cannot be attributed to alleged misstatements by any Defendant.

B.   The Economic Evidence Does Not Support the Conclusion that Information Released on November 20, 2007 Constituted a Curative Disclosure that Corrected Material Misrepresentations or Omissions.

161.   Unable generally to identify effective dates with statistically significant abnormal return in the expected direction, one would expect to see Dr. Hallman offer an analysis of curative disclosures as a proof or demonstration of materiality.

162.   At deposition, Dr. Hallman testified that he did not examine any disclosure for the purpose of determining whether it was a curative disclosure.[229] In his report, Dr. Hallman does not analyze the alleged curative disclosures identified by Plaintiff in the TAC, with one exception. The only alleged curative disclosure that Dr. Hallman has analyzed is the November 20, 2007 press release. The TAC asserts that, in the November 20, 2007 press release, "[f]or the first time, **Defendants admitted that Freddie Mac's investments in subprime and nontraditional mortgage products had subjected Freddie Mac to significant risk and caused it to sustain substantial losses**."[230] Similarly, the TAC states that "**the November 20, 2007 press release admitted that the**

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[228]   The TAC also states that the *Business Week* article noted that Freddie Mac and Fannie Mae "mitigate their risk by primarily owning the highest-rated securities in the subprime group and then adding credit enhancements, extra insurance against potential losses." [TAC, ¶165]. However, such a comment cannot be considered material from an economic perspective because the Company's use of credit enhancements to mitigate credit risk was publicly disclosed throughout and even prior to the Proposed Class Period.

[229]   Hallman Dep., 363: 24 - 364: 3.

[230]   TAC, ¶190.

Company had been investing in subprime, Alt-A and nontraditional mortgage products."[231]   More generally, the TAC asserts that: "On November 20, 2007, **Freddie Mac finally revealed what it had knowingly or recklessly failed to disclose** during the Class Period."[232]

163. I have searched in the press release for economic evidence to support these allegations, and I have found none. As Freddie Mac's November 20, 2007 press release and the transcript of the Company's investor conference call that day make plain, the Company made no corrections to its purported disclosure defects regarding its subprime or operational risk exposure.

164. At deposition, Hallman stated that a working definition of subprime loan that was used often was based on a FICO score cutoff, which he believed was a score of 620 or 650.[233]

165. He also admitted that, because Freddie Mac had previously disclosed the various credit characteristics of the loans in its guarantee portfolio, including FICO scores, the market could not have learned of Freddie Mac's subprime exposure for the first time in the November 20, 2007 press release.[234]

166. The Company's press release that day, which the TAC cites as a purported curative disclosure, does not even mention the terms "subprime," "nontraditional loan products" or "fraud", which according to the Plaintiff are the central issues about which the Defendants had misled investors during the Proposed Class Period.

167. Although Freddie Mac acknowledged that its Q3 2007 results had been "impacted by the deterioration" in 2007 in "**the country's housing and credit markets**"[235] [which was well-known publicly], such a statement does not constitute an admission for the "first time" that "Freddie Mac's investments in subprime and nontraditional mortgage products

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[231] TAC, ¶227.

[232] TAC, ¶134.

[233] Hallman Dep., 295: 9 - 16.

[234] Hallman Dep., 346: 10 - 347: 12.

[235] Quoted in TAC at ¶190.

had subjected Freddie Mac to significant risk and caused it to sustain substantial losses" as the Plaintiff asserts.[236] To the contrary, in its conference call the same day, Freddie Mac discussed its previously disclosed subprime exposure in its Retained portfolio (as the TAC acknowledges[237]) and noted that:[238]

> The credit profile of our [R]etained portfolio **remains of the highest credit quality** with 57% in agency mortgages and 33% in non-agency securities, of which 97% is triple A rated and does not include any CDOs. … Despite the continued deterioration of the housing market and increases in non-prime delinquencies, we remain comfortable with our risk position on these assets. **For the subprime securities**, while we have experienced some downgrades, … **no losses are projected on these securities**.

168. Notably, on November 20, 2007, Freddie Mac did not disclose the specific amounts of EA, C1 and C2 loans that were contained within its single family guarantee portfolio: rather, it provided numerous other credit characteristics regarding the composition of its guarantee portfolio. The public was not informed of the specific amounts of EA, C1 and C2 loans that were contained within its single family guarantee portfolio until Freddie Mac entered into a Non-Prosecution Agreement with the SEC on December 16, 2011, more than 4 years after the Proposed Class Period had ended.

169. In short, the decline of Freddie Mac's stock price following its Q3 2007 earnings release on November 20, 2007 cannot be considered a result of a curative disclosure and hence it cannot be deemed to be a measure of artificial inflation impounded in Freddie Mac's stock price prior to this date due to alleged misrepresentations or omissions at earlier points in time.

170. The Plaintiff does not identify how specific alleged misrepresentations or omissions were cured in the period following the Proposed Class Period through specific corrective

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[236] TAC, ¶190.

[237] As TAC mentions, at the end of 2006, "Freddie had … about $124 billion of AAA rated subprime exposure in [its] retained portfolio." [TAC, ¶84].

[238] "FRE - Q3 2007 Freddie Mac Earnings Conference Call," *Thomson StreetEvents*, November 20, 2007.

disclosures. Nor does Dr. Hallman offer any economic evidence to confirm that Freddie Mac's price reactions on purported disclosure dates can be attributed to such disclosures.

C.   **The Alleged Failure to Disclose Freddie Mac's Internal Designations of Certain Loans as C1, C2 and EA Was Not Material, From An Economic Perspective.**

1.   **To Enable Investors to Gauge Its Credit Risk, Freddie Mac Provided Detailed Economic Characteristics of the Mortgage Portfolio, As Well As Data Regarding Past Performance, Expected Future Losses, and Provisions For Credit Losses.**

171.   As Freddie Mac noted in an annual report, it faced mortgage credit risk that a borrower might "fail to make timely payments on a mortgage or security [Freddie Mac] own[ed] or guarantee[d]."[239] In addition to the general economy, Freddie Mac's mortgage portfolio's credit risk was primarily related to certain economic characteristics of mortgages within the portfolio, such as the "credit profile of the borrower on the mortgage, the features of the mortgage itself, [and] the type of property securing the mortgage."[240] Accordingly, the Company disclosed such key characteristics of its Single Family Total mortgage portfolio ("mortgage portfolio") in detail.[241]

172.   Specifically, the Company disclosed the proportion of its portfolio that belonged to particular credit score ranges, and (original and current) loan-to-value ratio ("LTV ratio") ranges. The Company also disclosed the proportion of its portfolio that was comprised of loans for particular purposes (purchase or cash-out refinance, among others), loans for particular types of property and loans for unoccupied properties.

173.   According to economic principles, such characteristics are key factors in assessing the credit risk related to mortgages.[242] As Freddie Mac disclosed, "there is no universally accepted definition" of the term "subprime."[243] Hence, the Company did not

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[239]   Freddie Mac 2005 Annual Report, page 63.

[240]   Freddie Mac 2006 Annual Report, page 66.

[241]   See, *e.g.*, Freddie Mac 2005 Annual Report, Table 37 at page 67 and Freddie Mac 2006 Annual Report, Table 38 at page 70.

[242]   Avery, Robert B. Raphael W. Bostic, Paul S. Calem, and Glenn B. Canner (1996), "Credit Risk, Credit Scoring, and the Performance of Home Mortgages," *Federal Reserve Bulletin*; henceforth "Avery *et al.* (1996)".

[243]   Freddie Mac 2006 Annual Report, page 69.

"characterize the single-family loans underlying the PCs and Structured Securities in [its] credit guarantee portfolio as either prime or subprime."[244] Instead, given the lack of unanimity regarding what the term "subprime" even means, the Company's detailed disclosures of its mortgage portfolio's credit characteristics conveyed relevant information to investors in a way that would enable them to evaluate the credit risk in Freddie Mac's loan portfolio.

174. For instance, Freddie Mac's disclosures were sufficient to enable an investor to calculate the share of the Company's portfolio that comprised loans to borrowers with FICO scores[245] less than 620 or 660 or the share dedicated to mortgages with LTV ratios above 80% or 90%. As an illustration, consider the Company's 2006 Annual Report where Freddie Mac disclosed that 10% and 5% of the single family loans it had purchased during 2006 were loans made to borrowers with FICO scores from 620 to 659 and below 620, respectively.[246] By adding these two numbers (10% and 5%), an investor could determine that 15% of the Company's portfolio comprised mortgages to borrowers with FICO scores less than 660.

175. Notably, at deposition, Dr. Hallman testified that Freddie Mac disclosed in its 2005 and 2006 annual reports key credit characteristics to investors, including LTV ratios and FICO scores, and that such information was reflected in the price of Freddie Mac stock.[247] Dr. Hallman also testified that, while he did not know if there was a market consensus as to the definition of a subprime loan, a "working definition that was used often… was based on a FICO cutoff."[248] He believed that FICO score "cutoff" was either

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[244] Freddie Mac 2006 Annual Report, page 69.

[245] As Freddie Mac disclosed, "Credit scores are a useful measure for assessing the credit quality of a borrower. Credit scores are numbers reported by credit repositories, based on statistical models, that summarize an individual's credit record and predict the likelihood that a borrower will repay future obligations as expected. FICO scores, developed by Fair, Isaac and Co., Inc., are the most commonly used credit scores today." [Freddie Mac 2006 Annual Report, page 71].

[246] Freddie Mac 2006 Annual Report, Table 38 on page 70.

[247] Hallman Dep., 299: 3 – 304: 23; 307: 11 – 312: 21.

[248] Hallman Dep., 294:5 – 295:16.

620 or 650. [249] Accordingly, he testified that, to the extent that anyone defined subprime loans as FICO scores of below 620 or 660, Freddie Mac disclosed that information for 2003, 2004, 2005, and 2006. [250]

176.   It is important to note that, while Freddie Mac held mortgages with LTV ratios greater than 80% (as the Company noted in its disclosures throughout the Proposed Class Period), its charter required it to obtain credit enhancements at the time of purchase to offset the incremental risk associated with these mortgages. [251] Therefore, categorizing Freddie Mac's mortgages with LTV ratios higher than 80% as "subprime" would be incorrect from an economic perspective, as it would ignore the offsetting beneficial impact to the Company of such credit enhancements. [252] Further, Freddie Mac provided detailed disclosures regarding the performance of its credit-enhanced mortgage portfolio on a monthly basis throughout the Proposed Class Period.

177.   In addition to disclosing its key credit risk characteristics, the Company also disclosed how its mortgage portfolio had performed on a monthly basis by reporting the

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[249]   Hallman Dep., 294:5 – 295:16.

[250]   Hallman Dep., 300:23 – 301:9; 309:4 – 310:16.

[251]   Freddie Mac's credit enhancements included "one or more of the following: (a) primary mortgage insurance; (b) a seller's agreement to repurchase or replace any mortgage in default (for such period and under such circumstances as we may require); or (c) retention by the seller of at least a 10 percent participation interest in the mortgages. In addition, for some mortgage loans, we elect to share the default risk by transferring a portion of that risk to various third parties through a variety of other credit enhancements. In many cases, the lender's or third party's risk is limited to a specific level of losses at the time the credit enhancement becomes effective." [Freddie Mac 2006 Annual Report, page 67]. Freddie Mac recorded the fair value of such credit enhancements as an asset on its balance sheet. [Freddie Mac 2006 Annual Report, page 40, 147].

In addition, Freddie Mac also focused on other various other methods to manage its credit risk, including "underwriting requirements and quality control standards; portfolio diversification; and portfolio management activities, including loss mitigation and the use of credit enhancements." [Freddie Mac 2006 Annual Report, page 66].

[252]   Freddie Mac's charter also limited the size of a single mortgage that the Company could purchase to $417,000 in 2006-2007.   Such individual mortgage limits provided an additional safeguard against credit loss. As the Company noted, "Our charter places a dollar amount cap, called the '**conforming loan limit**,' on the size of the original principal balance of single-family mortgage loans we purchase. … Higher limits apply to two- to four-family residences. The conforming loan limits are also 50 percent higher for mortgages secured by properties in Alaska, Guam, Hawaii and the U.S. Virgin Islands. No comparable limits apply to our purchases of multifamily mortgages." [Freddie Mac 2006 Annual Report, page 3].

delinquency rates of different components of its single-family and multifamily mortgage portfolio.[253]

178.   Prior to and during the Proposed Class Period, Freddie Mac disclosed its "credit risk sensitivity" on a quarterly basis, which represented the present value of its "expected credit losses [in its single-family mortgage portfolio] from an immediate five percent decline in single-family home prices for the entire U.S." both with and without "receipt of private mortgage insurance claims and other credit enhancements."[254]   As the Company's credit risk sensitivity disclosure indicated, Freddie Mac's expected credit losses related to its single-family mortgage portfolio were likely to *increase* both in absolute terms ("NPV"), and as a percentage of the size of the portfolio which varied over time ("NPV ratio" terms) and, over the Proposed Class Period, as conditions in the U.S. housing markets deteriorated.

179.   The Company also disclosed its provision for credit losses on a quarterly basis, which increased over the Proposed Class Period.[255]

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[253]   Freddie Mac disclosed that its "Single-family delinquencies are based on the number of mortgages 90 days or more delinquent or in foreclosure while multifamily delinquencies are based on net carrying value of mortgages 60 days or more delinquent or in foreclosure." [Freddie Mac Monthly Volume Summary: August 2006, footnote 12].

[254]   Freddie Mac Supplement dated January 5, 2007 to Information Statement dated June 28, 2006, page 7.

[255]   See Figure 3

Figure 3 - Every Quarter over the Proposed Class Period, Freddie Mac Recorded Increasingly Larger Provisions for Credit Losses [256]
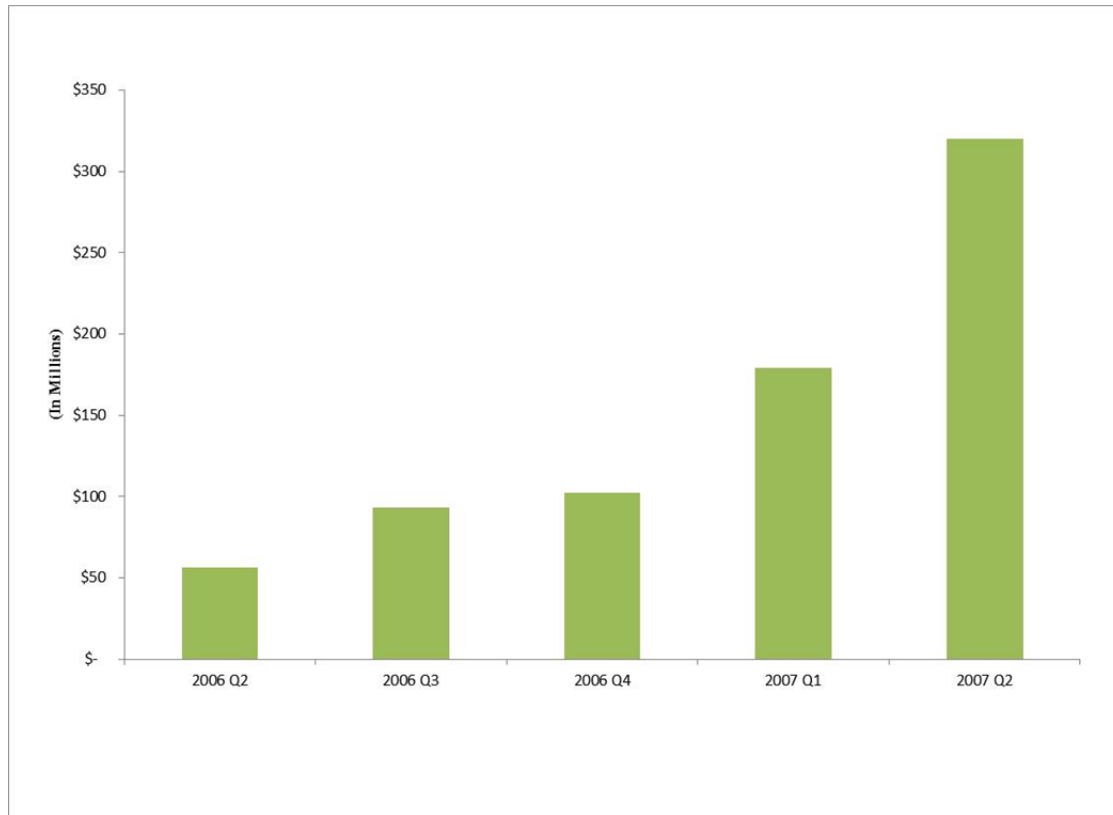
180. Credit risk characteristics assist investors to forecast (though imperfectly) the Company's expected future credit losses. Freddie Mac not only disclosed its relevant credit risk characteristics but also its expected future credit losses.

181. As Figure 3 shows, throughout the Proposed Class Period, Freddie Mac's delinquency rates remained stable and low relative to even conforming *prime* loans that were securitized by non-agency financial institutions.

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[256] Source: Freddie Mac Supplement dated August 30, 2007 to Information Statement dated March 23, 2007

Figure 4: As Freddie Mac Disclosed, Its Single Family Mortgage Delinquency Rates Were Even Lower than the Delinquency Rates for Non-Agency Prime Mortgages[257]
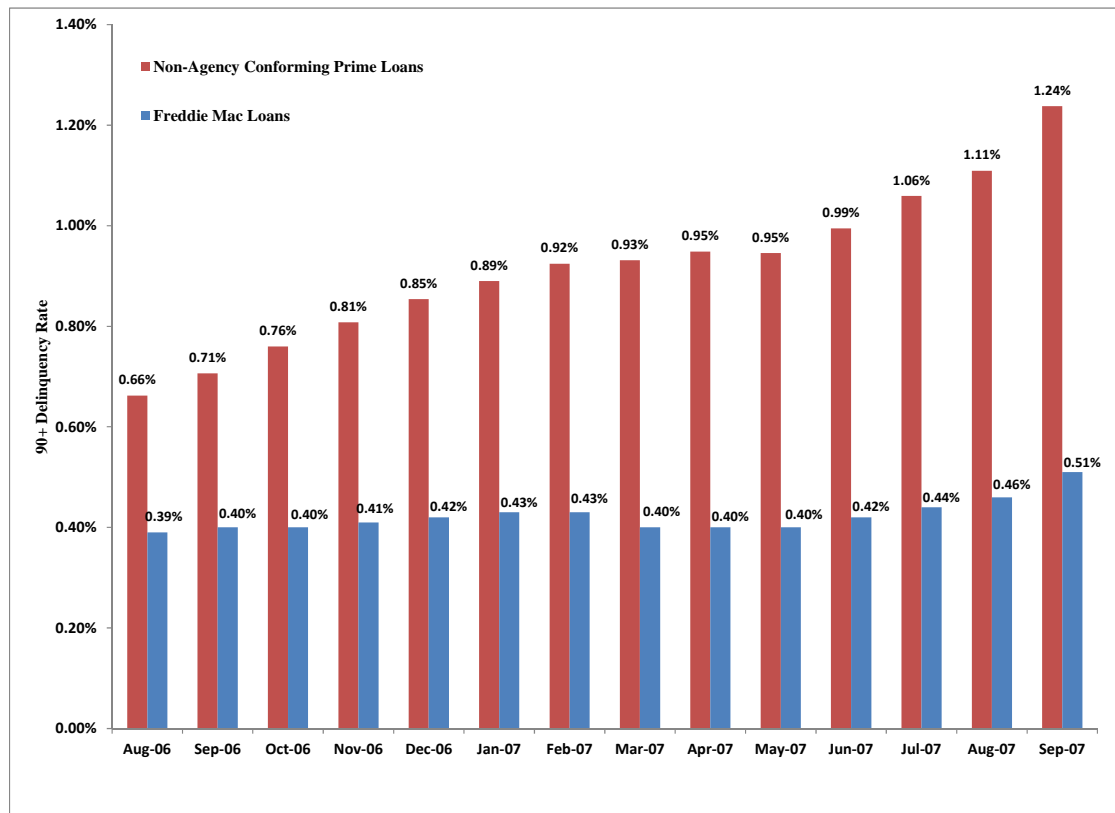
182.   As Freddie Mac had disclosed, "[t]here is no universally accepted definition of subprime."[258] While the term "subprime" is widely used, there is no consensus among market practitioners, regulators, or economists about what types of mortgages should be considered subprime.[259]   Therefore, Freddie Mac did not "characterize the single-family

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[257]   Data on Non-Agency Conforming Loans are obtained from *TrueStandings Securities* database.   Prime loans are designated within the data, and "are in general made to borrowers with good to very good credit based upon a traditional set of underwriting guide-lines." [www.truestandings.com]. The delinquency rate for Non-Agency Conforming Loans refer to the Mortgage Banker Association (MBA) Delinquency Count 90+ criterion.

[258]   Freddie Mac 2006 Annual Report, page 69.

[259]   "[T]here is no consensus among either lenders or researchers about what types of mortgages should be considered subprime." [Mayer, Chris and Karen Pence, (2008), "Subprime Mortgages: What, Where, and to Whom?," *Finance and Economics Discussion Series Divisions of Research & Statistics and Monetary Affairs Federal Reserve Board, Washington, D.C.,* pages 1 – 44 at page 1.]

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loans underlying the PCs and Structured Securities in [its] credit guarantee portfolio as either prime or subprime."[260]

183.   Nevertheless, Freddie Mac did not confine itself to the extensive disclosure of the financial data I have discussed thus far. Additionally, Freddie Mac disclosed its growing participation in nontraditional loans during the Proposed Class Period. For example, on March 23, 2007, in its 2006 annual report, Freddie Mac disclosed that: [261]

> As the residential mortgage market continues to grow, competition among loan originators and other market factors, such as relatively low interest rates and generally high home prices, have led to a higher proportion of variable-rate mortgage products and the proliferation of new mortgage products that offer borrowers a variety of payment options. **We increased our purchases of these variable-rate and non-traditional mortgage products as they became more prevalent in the market**.

2.   Given Freddie Mac's Detailed Disclosures during the Proposed Class Period, the Alleged Omission of Internal Loan Designations Was Not Material.

184.   Relying on the purported statement of facts set forth in Exhibit A to the Non-Prosecution Agreement ("NPA") that Freddie Mac entered into with SEC on December 16, 2011 to "substantially support [its] claims,"[262] the Plaintiff alleges that Freddie Mac misled investors as to the number of "Caution Loans (C1, C2)" and "'Expanded Approval' (or 'EA') loans" in its Guarantee portfolio.[263]

185.   Given the detailed disclosures that I discuss above, the allegation that it was a material omission for the Company not to disclose the share of its portfolio comprised of mortgages with certain internal designations, such as C1, C2 or EA, is illogical from an economic perspective.

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[260] Freddie Mac 2006 Annual Report, page 69.

[261] Freddie Mac 2006 Annual Report, page 24.

[262] TAC, ¶12.

[263] TAC, ¶¶ 37, 61, 138.

186.   Similarly, the allegation that Freddie Mac misled investors about the high credit risk of its mortgage portfolio by failing to disclose the share of its portfolio comprised of C1, C2, or EA mortgages is also illogical from an economic perspective.

187.   As I have discussed above, Freddie Mac made detailed disclosures about the credit characteristics of its Guarantee portfolio, which investors could use to gauge the Company's credit risk profile. For instance, given the Company's disclosures about the percentage of its mortgage portfolio to borrowers with different categories of FICO scores, and to mortgages in different LTV ratio categories, investors could readily calculate the share of the Company's mortgage portfolio that consisted of loans to borrowers with FICO scores less than 660, or loans with LTV ratio higher than 80%, by simply adding certain disclosed line items in Freddie Mac's Annual Reports.

188.   Further, as I noted above, Freddie Mac's mortgage credit risk characteristics are relevant from an economic perspective only to the extent that they help shareholders gauge the Company's expected losses due to credit risk. As the Company also provided detailed disclosures about its portfolio's mortgage performance, expected losses and its provisions for credit losses, the Plaintiff's allegation that Freddie Mac's purported failure to disclose the proportion of its mortgage portfolio that was internally designated as C1, C2 or EA constituted a material misrepresentation is illogical from an economic perspective.

189.   Freddie Mac's internal designations for particular loans would be immaterial to a reasonable investor, as it would not change the "total mix of information" that a reasonable investor would consider material, *i.e.*, relevant to assess the Company's credit risk and the performance of the Company's mortgage portfolio. Rejecting an identical claim by the plaintiffs in another class action against Freddie Mac, the Court in the Southern District of New York recently opined:[264]

> Freddie Mac's broad disclosure [of] all of its loan characteristics
> was an accurate way to relay information to investors, given the

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[264] *Jino Kuriakose, individually and on behalf of all others similarly situated, Plaintiff, against Federal Home Loan Mortgage Corp., Richard Syron, Patricia L. Cook, And Anthony S. Piszel, Defendants*. United States District Court, Southern District Of New York 08 Civ. 7281 (JFK), Opinion and Order dated September 24, 2012.
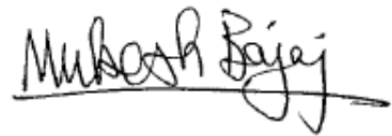
> confusion surrounding the term "subprime." Freddie Mac's method of disclosing information made it possible for a reasonable investor to, with little effort, take his own measure of risk in Freddie Mac's loan portfolio.

190. Given Freddie Mac's detailed disclosures during and prior to the Proposed Class Period regarding the risks that the Company faced during the Proposed Class Period, in my opinion, there is no economic evidence to suggest that Freddie Mac's failure to disclose the amount of its portfolio by internal loan designation constituted an omission of material fact.

191. This conclusion is consistent with and further confirms my opinion set forth above, that the economic evidence does not support a finding that the Defendants' alleged misrepresentations and omissions inflated the price of Freddie Mac's common stock.

V.   CONCLUSIONS

192. In my opinion, Dr. Hallman fails to establish that the market for Freddie Mac stock was semi-strong form efficient during the Proposed Class Period. His event study results, if anything, prove that it was not. Dr. Hallman's event study is fundamentally flawed for numerous reasons and its results are unreliable.

193. In my opinion, the economic evidence does not support a finding that the alleged misrepresentations and omissions inflated the price of Freddie Mac's common stock or that they were material.

Respectfully submitted,

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Mukesh Bajaj, Ph. D

December 14, 2012

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